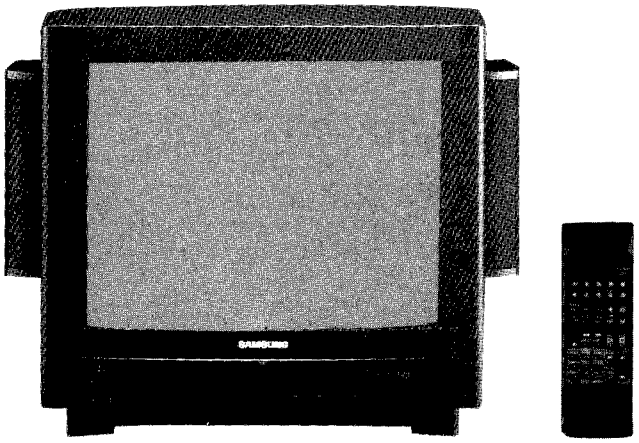
SAMSUNG Electronics

VHS HQ

SERVICE MANUAL

MODEL: TVCR4500G/SGX
CHASSIS: P58M & RM204

MONITOR & VIDEO CASSETTE RECORDER



SPECIFICATION

Format	: VHS PAL standard
Recording System	: 2 Rotary Heads, Helical scanning system Luminance:; FM azimuth recording Color; Down Converted subcarrier phase shifted direct recording
Television System	: PAL/SECAM-B/G
Tape Width	: 12.65 mm (1/2 inch)
Tape Speed	: SP; 23.39 mm/sec
Record/Playback Time	: SP; 4 hours with E-240 type
FF/REW Time	: Less than 6 min. with E-120
Heads	: Video; 2 rotary heads Audio Control; 1 stationary head Erase; 1 full track erase
VIDEO	
Input	: 0.5 to 2.0 Vp-p; 75 ohm Unbalanced
Output	: 1.0 Vp-p; 75 ohm Unbalanced
Signal-to-Noise Ratio	: Better than 43 dB(SP)
Horizontal Resolution	: More than 240 lines

AUDIO	
Input	: Line; -8 dBm, 50K ohm unbalanced
Output	: Line; -4 dBm, 1K ohm unbalanced
Wow-Flutter	: 0.4% Max.
Frequency Response:	: 100Hz - 8KHz
Receiving Channel	: VHF; 0 - 20 UHF; 21 - 69
Picture Tube	: 21" 54HGB99X-ITC diagonal measured, 90° degrees deflection
Power Requirement	: AC 230V, 50Hz, 95Watt
Operating Temperature	: 40°F - 104°F (5°C - 40°C)
Operating Humidty	: 10% - 75%
Weight	: 33.5Kg
Dimensions (m/m)	: 687(W)x503.5(H)x465.5(D)
Features	: F/S Tuning system, Dark Tube, 60CH programmable, 8 Event/Year, One Touch record, VPS, VISS, SP, 2 Ear-Speakers (Swinel), 43-Key Transmitter

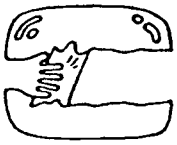
SAFETY CAUTION :

Before servicing this chassis, it is important that a service technician reads and follows the "Safety Precaurion" and "Product Safety Notice" in this Service Manual.

* For continued X-radiation protection, replace the picture tube with original type.
* Design and specifications are subject to change without prior notice.
* WARNING-SHOCK HAZARDS : Use an isolation transformer when servicing.

For Safe Use

1. Read all of these instructions.
2. Save these instructions for later use.
3. Unplug this television receiver from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaning.

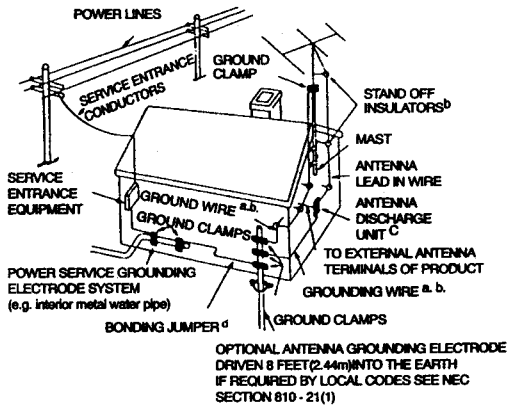


4. Do not use attachments not recommended by the television receiver manufacturer as they may cause hazards.
5. Do not use this television receiver near water for example, near a bathtub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, etc.
6. Do not place this television receiver on an unstable cart, stand, or table. The television receiver may fall, causing serious injury to a child or an adult, and serious damage to the appliance. Use only with a cart or stand recommended by the manufacturer, or sold with the television receiver. Wall or shelf mounting should follow the manufacturer's instructions, and should use a mounting kit approved by the manufacturer.
7. Solts and openings in the cabinet and the back or bottom are provided for ventilation, and to insure reliable operation of the television receiver and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the television receiver should not be placed in a built-in installation such as a bookcase unless proper ventilation is provided.
8. This television receiver should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your television dealer or local power company. For television receivers designed to operated from battery power refer to the operating instructions.

9. This television receiver is equipped with a polarized alternating-current line plug(a plug having one blade wider than the other.) This plug will fit the power outlet only one way. This is safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose on the polarized plug.

If your television receiver has a threewire grounding-type plug, please note the following. This television receiver is equipped with a 3-wire grounding type plug(a plug having a third(grounding) pin). This plug will only fit into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolet outlet. Do not defeat the safety purpose of the grounding plug.

FIGURE 1.
EXAMPLE OF ANTENNA GROUNDING ACCORDING TO NATIONAL ELECTRICAL CODE INSTRUCTIONS CONTAINED IN ARTICLE 810 - "RADIO AND TELEVISION EQUIPMENT"


POWER LINES
SERVICE ENTRANCE CONDUCTORS
GROUND CLAMP
STAND OFF INSULATORS b
MAST
ANTENNA LEAD IN WIRE
SERVICE ENTRANCE EQUIPMENT
GROUND WIRE a.b.
GROUND CLAMPS
ANTENNA DISCHARGE UNIT c
TO EXTERNAL ANTENNA TERMINALS OF PRODUCT
POWER SERVICE GROUNDING ELECTRODE SYSTEM (e.g. interior metal water pipe)
GROUNDING WIRE a. b.
BONDING JUMPER d
GROUND CLAMPS
OPTIONAL ANTENNA GROUNDING ELECTRODE DRIVEN 8 FEET(2.44m)INTO THE EARTH IF REQUIRED BY LOCAL CODES SEE NEC SECTION 810 - 21(1)

NOTES :

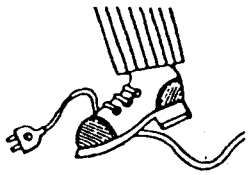
a. Use No. 10 AWB(5.3mm2) copper, No. 8 AWG(8.4mm2) aluminum. No. 17 AWG(1. 0mm2) copperclad steel or bronze wire, or larger, as a ground wire.

b. Secure antenna lead-in and groundwires to house with stand-off insulators spaced from 4-6 feet(1.22-1.83m) apart.

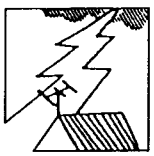
c. Mount antenna discharge unit as close as possible to where lead-in enters house.

d. Use jumper wire not smaller than No. 6 AWG(13.3mm^2) coppper, or the equivalent, when a separate antennagrounding electrode is used.

10. Do not allow anything to rest on the power cord. Do not locate this television receiver where the card will be abused by persons walking on it.



11. Follow all warnings and instructions marked on the television receiver.
12. If an outside antenna is connected to the television receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, NFPA No. 70-1975, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of gounding conductors, location of antennadicharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure 1.



13. For added protection for this television receiver during a lightening storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna. This will prevent damage to the receiver due to lightning and power-line surges.
14. An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system extreme care should be taken to keep from touching, such power lines or circuits as contact with them might be fatal.
15. Do not overload wall outlets and extension cords as this can result in fire or electric shock.
16. Never push objects of any kind into this television receiver through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electronic shock. Never spill liquid of any kind on the television receiver.
17. Do not attempt to service this television receiver yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
18. Unplug this television receiver from the wall outlet and refer servicing to qualified service personnel under the follwing conditions:
    a. When the power cord or plug is damaged or frayed.
    b. If liquid has been spilled into the television receiver.
    c. If the television receiver has been exposed to rain or water.
    d. If the television receiver does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the television receiver to normal operation.
    e. If the television receiver has been dropped or the cabinet has been damaged.
    f. When the television receivers exhibits a distinct change in perfomance-this indicates a need for service.
19. When replacement parts are required, be sure the series technician has used replacement parts specified by the manufacturer that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.
20. Upon completion of any service or repairs to this television receiver, ask the service technician to perform routine safety checks to determine that the television is in safe operating condition.
21. Television equipment and car combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the equipment and cart combination to overturn.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed, unnoticed by visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The replacement parts which have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by shading on the schematic diagram and the parts list.
Before replacing any of these components, read the parts list in this manual carefully. The use of subsititute parts which do not have the same safety characteristics in the parts list may create a shock, fire, X-radiation or other hazards.

SERVICE NOTES

1. When replacing the parts or the circuit boards, clamp the lead wires to the terminals before soldering.
2. When replacing a high wattage resistor (oxide metal film resistor) in the circuit board, keep the resistor 10 mm (1/2 in.) away from the circuit board.
3. Keep the wires away from high voltage or high temperature components.
4. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the chassis parts list.

	CAUSION RISK OF ELECTRIC SHOCK DO NOT OPEN	
The lighting flash and arrowhead within the triangle is a warning sign alerting you of "dangerous voltage" inside the product.	CAUTION : To reduce the risk of electric shock, do not remove cover (or back) no user serviceable parts inside. Refer servicing to qualified service personnel.	The exclamation point within the triangle is a warning sign alerting you of important instructions accompanying the product.

X-RADIATION PRECAUTION

1. The excessive high voltage can produce potentially hazardous X-RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The norminal value of the high voltage of this receiver is 28KV at zero beam current (minimum brightness). The high voltage must not, under any circumstances, exceed 28.5KV. Each time a receiver requires servicing, the high voltage should be checked following the HIGH VOLTAGE CHECK procedure in this manual. It is recommended that the reading of the high voltage should be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RADIATION in this TV receiver is the picture tube. For continued X-RADIATION protection, the replacement tube must be exactly the same type as specified in the parts list.
3. Some parts in this receiver have special safety-related charactridtics for X-RADIATION protection. For continued safety, the parts replacement should be undertaken only after referring to the PRODUCT SAFETY NOTICE.

SAFETY PRECAUTION

Warning: The service should not be attempted by anyone unfamiliar with the necessary precautions in this receiver. The followings are the necessary precautions to be observed before servicing.

Since the chassis of this receiver is directly connected to the AC power line-(Hot chassis), an isolation transformer should be used during any dynamic service to avoid possible shock hazards.

1. Always discharge the picture tube anode to the CRT conductive coating before handling the picture tube. The picture tube is highly evacuated and if broken, the glass fragments will be violently expelled. Use shatterproof goggles and keep the picture tube away from the bare body while handling.
2. When replacing a chassis in the cabinet, be always certain that all the protective devices are put back in place, such as non-metallic control knobs, insulating covers, shields, isolation resistor-capacitor network, etc.
3. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminal, screwheads, metal overlays, control shafts, etc. To be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly to the AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5000 ohm per volt or more sensitivity in the following manner. Connect a 1500 ohm 10 watt resistor, paralled by a 0.15μF, AC type capacitor, between a good earth ground (water pipe, conduit etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and 0.15μF capacitor. Reverse the AC plug at the AC outlet and repeat the AC voltage measurements for each exposed metallic part. The voltage measured must not exceed 0.3 volts RMS. This corresponds to 0.2 milliamp AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

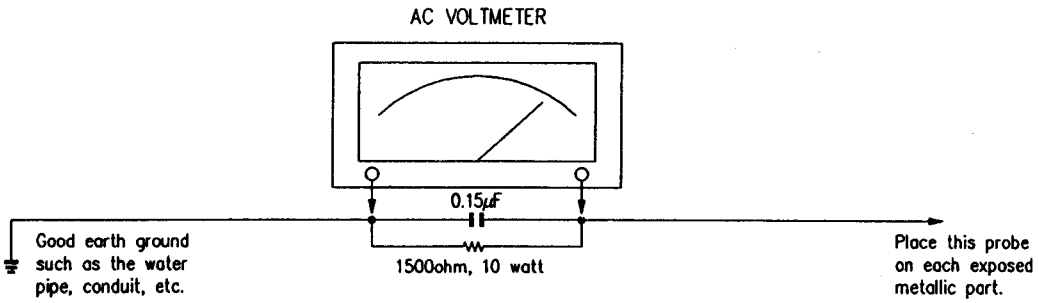

AC VOLTMETER
0.15μF
Good earth ground such as the water pipe, conduit, etc.
1500ohm, 10 watt
Place this probe on each exposed metallic part.

Figure 1. AC Leakage Current Check

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1. GENERAL DESCRIPTION

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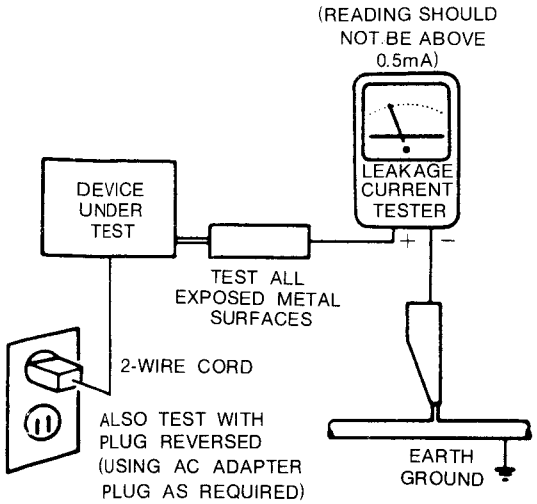
1. Before returning a Monitor and Video Cassette Recorder to the customer, always make a safety check of the entire instrument, including, but not limited to the following items :

a. Be sure that no built-in protective devices are defective and/or have been defeated during servicing.
(1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience.
(2) When reassembling the instrument, be sure to put back in place all protective devices, including, but not limited to nonmetallic control knobs, insulating fish papers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks.
Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning.

b. Be sure that there are no cabinet openings through which an adult or child might be able to inset their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) excessively wide cabinet ventilation slots, and (2) improperly fitted and/or incorrectly secured cabinet covers.

c. **Antenna Cold Check**-With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohmmeter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, to each of the coaxial connectors. If the measured resistance is less than 1.0 megaohm or greater than 5.2 megaohm, an abnormality exists that must be corrected before the instrument is returned to the customer.
Repeat this test with the instrument AC switch in the off position.



AC Leakage Test

d. **Leakage Current Hot Check**-With the instrument completely reassembled plug the AC line cord directly into a 220 (240V-UK) AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) *C101. 1 Leakage Current for Appliances* and Underwriters Laboratories (UL) *1410, (50.7).* With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal waterpipe, conduit, etc) to all exposed metal parts of the instrument (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, controls shafts, etc), expecially any exposed metal parts that after an electrical return path to the chassis.
Any current measured must not exceed 0.5 milliamp.
Reverse the instrument power cord plug in the outlet and repeat test.

ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR CONNECTING ANTENNA OR ACCESSORIES.

AC Leakage Test
1. Avoid shock hazards. The television instrument, accessory, or cables(s) to which this is connected should have the applicable sections of the leakage resistance antenna cold check and the leakage current hot check performed.
Do not connect this MVCR to a TV antenna, cable or accessory that exhibits excessive leakage currents.

2. Read and comply with all caution and safety related notes on or inside the MVCR cabinet and chassis.

3. Design Alteration Warning-Do not alter or add to the mechanical or electrical design of this Monitor and Video Cassette Recorder. Design alterations and additions, in cluding, but not limited to circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this instrument and create a hazard to the user. Any design alterations or additions may void the manufacturer's warranty and may make you, the servicer responsible for personal injury or properly damage resulting therefrom.

4. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: a. near sharp edges, b. near thermally hot parts-be sure that leads and components do not touch thermally hot parts, c. the AC supply, and d. antenna wiring. Alway inspect in all areas for pinched, out-of-place, or frayed wiring. Do not change spacing between components, and between components and the printed circuit board.
Check AC power cord for damage.

5. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take of corrective action to remove any potential safety hazard.

6. Product Safety Notice

Some electrical and mechanical parts have special safety related characteristics which are often not evident from visual inspection, not can the protection they give necessarily by obtained by replacing them with components rated for higher voltage, wattage, ect. Parts that have special safety characteristics are identified by a(*) or (⚠) on schematics and parts list. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards.
Products safety is under review continuously and new instructions are issued whenever appropriate.

Electrostatically Sensitive (ES) devices.

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called *Electrostatically Sensitive (ES) Devices*. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to appling power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.

3. Use only a *ground-tip* soldering iron to solder or unsolder ES devices.

4. Use only an *anti-static* type solder removal device. Some solder removal devices not classified as "antistatic" can generate electrical charges sufficient to damage ES devices.

5. Do not us freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.

6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).

7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

SPECIAL NOTE
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

NOTE
Do not use the number shown on this drawing for ordering. The correct part number is shown in the parts list. And may be slightly different or amended since this drawing was prepared.

IMPORTANT SAFETY NOTICES
Components identified with the mark. ⚠ have the special charateristics for safety when replacing any of these components. Use only the same type.

1-2. GENERAL INFORMATION

*** VISS**
Index Search System
Index search system is the function of searching swiftly each wanted point after inputting the INDEX signal at the important scene recording mode.

• Index Search
Searchs the wanted index points and plays back for five minutes at each point.

• Intro-Scan
Skip the unwanted index points and plays back the selected point

• Marking Index Points
In either play or record mode, press "MARK" button on remote to record index point on tape. The index indicator will blink on the display

• Erasing Index Points
In play mode, press erase button and the unit will engage in visual search forward until an index point is reached, the index point will then be erased and the "INDEX" indicator will blink, the unit will the resume the play mode.

*** VPS(Video Program System)(OPTION)**
V.P.S is a new system to prevent in correct recordings being mode due to a TV program being postponed or cancelled.

*** LTC(Linear Time Counter)**
This function resets the counter when front loading starts after inserting a tape. Linear time counter indicates the elapsed time of the tape running as second.

*** Unattened(timer) Recording**
The programmable timer can be preselected up to one year in advance to record up to 8 preselected programmes. (normal programme or daily programme or weekly programme). The timer turns MVCR on and off and changes channels automatically.

*** One touch Recording(O. T. R)**
One touch recording (OTR) lets you record up to four hours without programming the timer. It also allows you to start (or continue) recording immediately or to delay recording up to 24 hours. when the recording is finished, the MVCR will turn off automatically.

*** F-Advance (Frame-Advance)**
This functions moves frame until noise bar disappear on the picture. Then you can enjoy clear and distinct still picture.

*** V-Lock(+/−)**
This function adjusts vertical shaking of TV screen.

***Tracking(+/−)**
This button is to be used to eliminate streaks(noise bar) from the picture during playback and slow. (Normally Auto tracking is performed)

*** Auto Memory**
This function remembers the channel automatically by the NV-RAM.

*** Search(JET)**
If you push FF/REW button once more for "reverse picture search" mode or "forward picture search" mode, picture search is performed 9 times as fast as normal speed.

*** X2**
If you push play button twice in normal playback mode, picture search is performed 2 times as fast at normal playback.

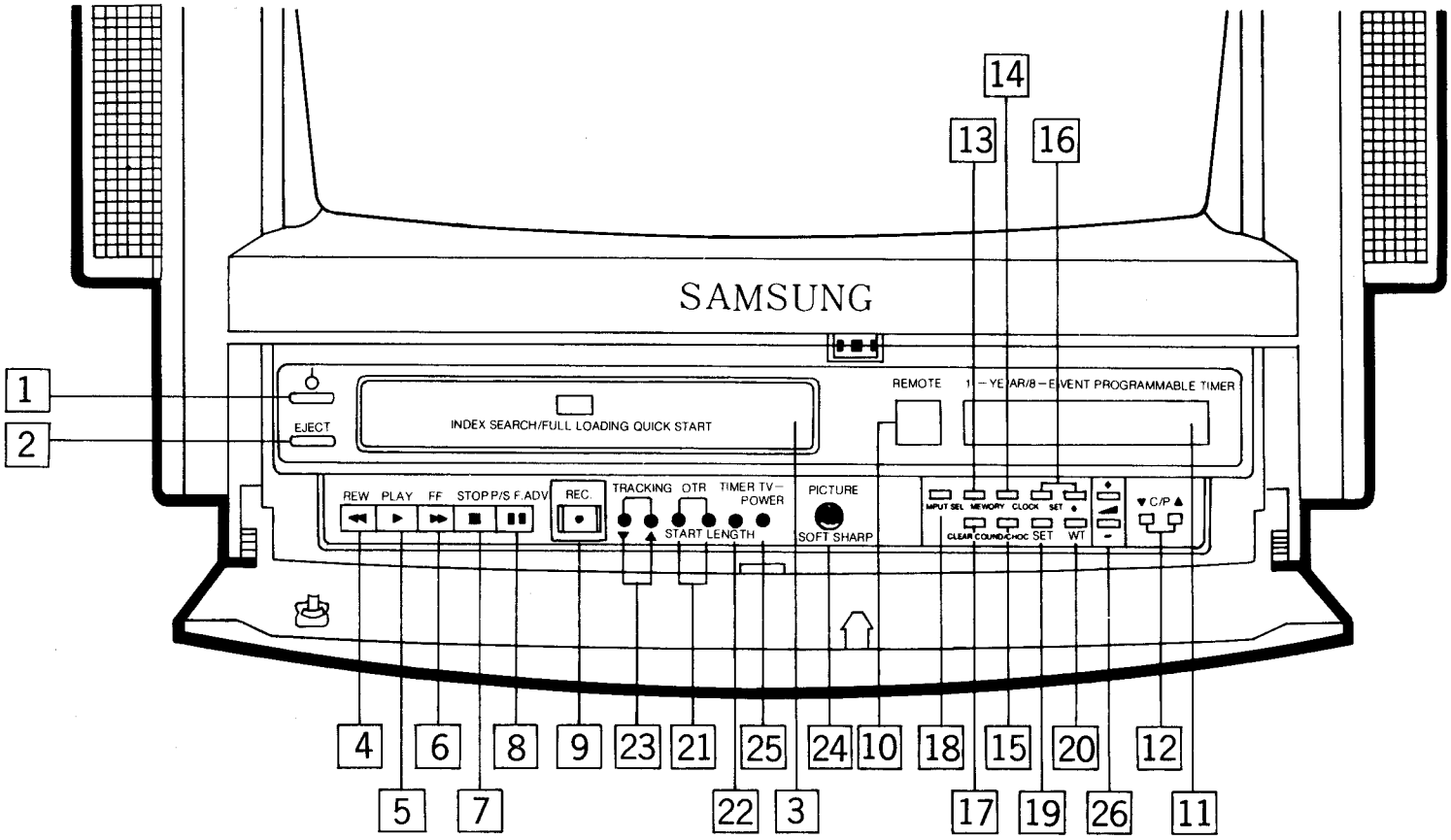
***Monitor**
When you push the monitor switch on the remote control in play bake mode, you can watch the TV programme which is set before hand. If you push the monitor switch once more; the sereen will turn to the original mode. When the TV programme is on screen, the video tape keeps going on.

*** Slow(1/8 States Slow)**
This is for one eighth slow picture than normal picture.

*** Quick Start**
This is to shorten the switching time from stop mode to play mode by file loading deck.

1-3. OPERATING CONTROLS AND FUNCTIONS.

1-3-1. FRONT VIEW



1. POWER BUTTON(⏻)
Push to turn MVCR on and off.

Note :VCR turns on automatically when cassette is inserted.

2. EJECT BUTTON
Push to remove the cassette tape. Cassette can be ejected with the MVCR Power off as long as MASTER SWITCH is on.

3. VIDEO CASSETTE COMPARTMENT
Push the cassette gently into the compartment until you feel automatic pull. Cassette can be inserted with the Power off as long as MASTER SWITCH is on.

4. REW(Rewind/Reverse Picture Search)BUTTON
When MVCR is in STOP mode, press REW to rewind the tape. When the MVCR is in the PLAY mode, press REW for high-speed reverse picture search. Press REW again for Jet Search. (Push PLAY button in Jet Search mode to playback.)

5. PLAY/x2 BUTTON
Push to playback a pre-recorded tape. Press PLAY again to x2 playback. This function lets you at x2 speed while the picture is played back on the screen.

Note : During x2 PLAYBACK the sound is muted and some noises appear on your screen. If noises appear, adjust TRK ▲, ▼ Key.

6. F.F (Fast Forward Picture Search) BUTTON
When the MVCR is in the STOP mode, press FF to forward the tape. When the MVCR is in the PLAY mode, press FF for high-speed forward picture search. Press FF again for Jet Search. (Push PLAY button in Jet Search mode to playback.)

7. STOP BUTTON
Push to stop the tape during playback, recording, rewind or fast-forward.

8. P/S F.ADV BUTTON
Push to pause the tape temporarily during playback or recording. Still picture will be shown during playback. Push PLAY to continue play, and push REC button to continue recording. In pause still mode, press to advance one frame at a time.

9. REC(RECORD) BUTTON
Push the REC button to start recording.

10. INFRARED REMOTE SENSOR
Receives signal from infrared Remote Control Transmitter.

11. FUNCTION DISPLAY INDICATORS
Refer to page 6 for indications.

12. C/P UP/DOWN BUTTONS(▲, ▼)
Push to select the programmed channel you wish to record or view on MONITOR. Continuous holding of button will change the programmed channel.

13. MEMORY BUTTON
Push this button the tape will stop automatically during rewind when the counter reaches about "0H00M00S". In CH preset mode, push this button after pressing the COUNT/CH. CC button, then your MVCR tuner selects only the channels with signal out of channels registered to the scan list.

14. CLOCK SET BUTTON
Press this button for clock setting.

15. COUNT/CH. CC BUTTON
Press this button to switch between the real channel display and the tape counter in the MVCR Fluorescent display section.

16. +, −BUTTON
In still mode, adjsut this control to minimize vertical shaking on the MONITOR. And press these buttons for clock setting, selection of a real channel, and MFT operation and CH Search.

17. CLEAR BUTTON
Use to reset the counter to "0H00M00S" or to clear the clock setting data or to delete stored channel.

18. INPUT SEL BUTTON
Select recording signal from the tuner or Audio/Video IN JACK.

19. SHIFT BUTTON
Press this button to go to the next step while you are doing clock setting, or the selection between CH and CC.

20. MFT BUTTON
Use to tune for fine picture. After pushing MFT Button in, control (+) and (−) button to show better picture.

21. OTR START, OTR LENGTH BUTTON
The START and LENGTH buttons are used for OTR recording.
- Press the START Button to set OTR start time. Start time can be delayed for up to 24 hours.
- Press the LENGTH Button to set OTR length of recording.

22. TIMER BUTTON
Press this button after programming for unattended recording.
Press to stop timer recording.

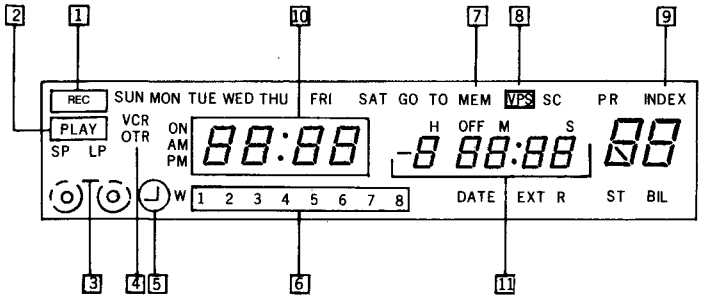
23. TRACKING ▲, ▼ BUTTONS
When you play a tape recorded on a different MVCR, horizontal streaks (noise bars) may appear in the picture. Press this buttons to remove noise bars.

24. PICTURE CONTROL
Use this control to soften or sharpen the VIDEO picture on the MONITOR.

25. TV −POWER BUTTON
Press this button to turn on or off the MONITOR.

26. VOLUME +, − BUTTON(◢)
Press the "+" button to increase the sound level.
Press the "−" button to decrease the sound level.

1-3-2. MULTIFUNCTION DISPLAY



1. RECORDING INDICATOR" REC "
When recording starts, this indicator appears.

2. PLAY INDICATOR" PLAY "
When PLAY, SLOW, FPS, RPS mode, this indicator appears.

3. STATUS INDICATOR
Indicates " " mark when a videocassette is in tape compartment. And "____"Marks indicate the status of MVCR. When MVCR is in PLAY, FF or FPS mode, "____" marks go clockwise as fast as linear time counter.
In REW or RPS mode, "____" marks go counter clockwise. In still mode, "____" marks are stopped.

4. O.T.R. INDICATOR "OTR"
When One Touch Recording is set, this indicator appears.

5. TIMER INDICATOR
When TIMER recording is set, this indicator appears.

6. PROGRAM NUMBER "1–8"
This shows the program number for Timer Recording

7. MEMORY INDICATOR "MEM"
When MEMORY button is set to ON, this indicator appears.

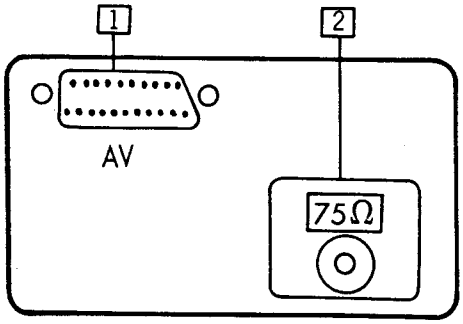
8. VPS INDICATOR (OPTION)
Illuminates when program recording is in VPS mode.

9. INDEX INDICATOR
This indicator blinks of lights when the INDEX button on remote control is pressed.

10. DIGITAL CLOCK
Normally, the present time is displayed.
In OTR mode, the start time is displayed.

11. MULTIFUNCTIONAL INDICATOR
This indicator displays clock/linear time counter/OTR LENGTH.

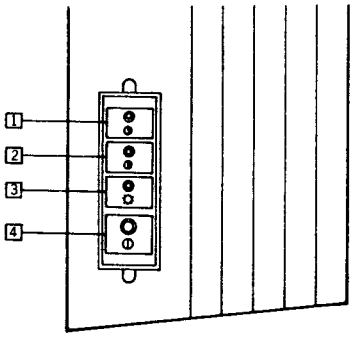
1-3-3. REAR PANEL



1. AUDIO/VIDEO Socket
A21 –PIN Audio/Video input/output socket for the connection to a TV equipped with the same type of socket.

2. ANTENNA IN Connector
Connet and aerial to this connector.

1-3-4. RIGHT PANEL



1. COLOUR CONTROL( )
Rotate the clockwise to increase the colour level.
Rotate the counterclockwise to decrease the colour level.

2. CONTRAST CONTROL( )
Rotate the clockwise to increase the contrast level.
Rotate the counterclockwise to decrease the contrast level.

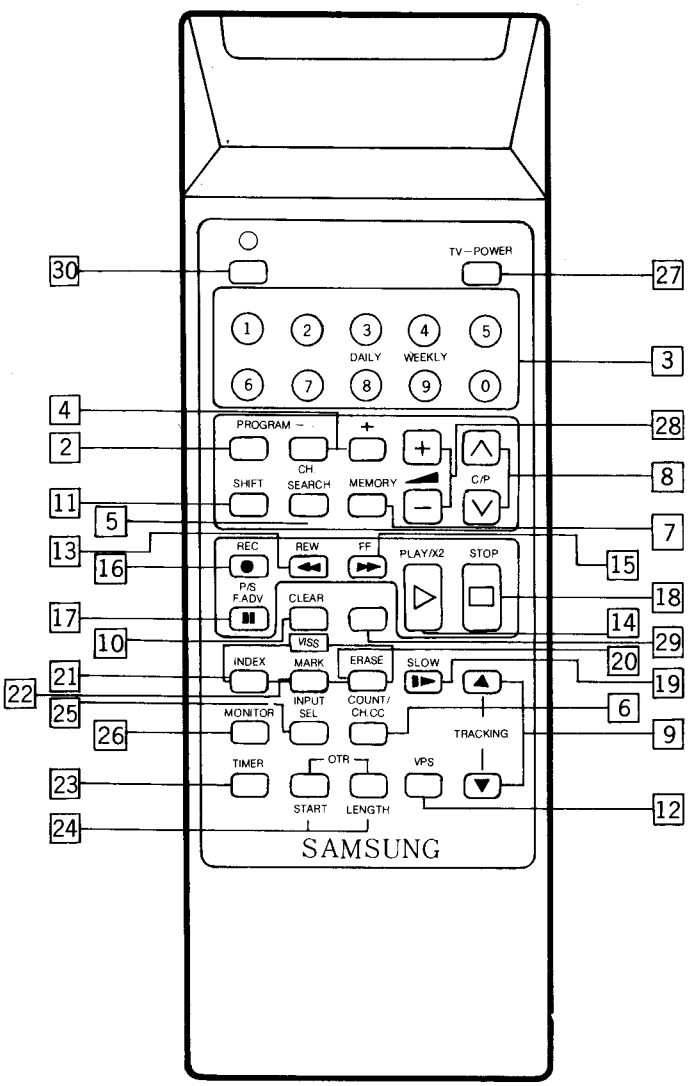
3. BRIGHTNESS CONTROL( )
Rotate the clockwise to increase the brightness level.
Rotate the counterclockwise to decrease the brightness level.

4. MASTER SWITCH(☼)
Push the MASTER SWITCH on the right side, then the set will be turned on.
Then you will see the light of stand-by indicator located in the front panel of the set.

NOTE : When you leave the house for a long period of them, trun off the MASTER SWITCH.

NOTE :
When MVCR is on abnormal mode, please do power on and off of MASTER SWITCH on and off. Then abnormal mode will be cleared.

1-3-5. REMOTE CONTROL



Location and Functions of the Remote Control Buttons

1. **POWER Button(⏻)**
   Power on and off the MVCR.

2. **PROGRAM Button**
   Press this button to enter PROGRAMMING mode. Press this to review timer programm after programming.

3. **10 KEY Buttons (0 to 9)**
   Select any channel (whether of not it is in the tuner scan list) by pressing two buttons. (Press "0", then "8", for channel 8.)
   These buttons are also used for setting the clock and programming the timer.

4. **+, −Buttons**
   In still mode, adjust this control to minimize vertical shaking on the MONITOR.
   And press these buttons for selection of a real channel, and MFT operation.

5. **CH. SEARCH Button**
   Press this button for automatic channel search. Then, press + or − key.

6. **COUNT/CH. CC Button**
   Press this button to switch between the real channel display and the tape counter display in the MVCR Fluorescent display section.

7. **MEMORY Button**
   Press this button. While rewinding, the tape will stop automatically when the counter reaches about "0H00M0S". IN CH preset mode, push this button after pressing the COUNT/CH. CC button then MVCR tuner selects only the channels with signal out of channels registered to the scan list.

8. **C/P UP(∧) DOWN(∨) Buttons**
   Push to select the programmed channel you wish to record of view on TV. Continuous holding of button will change the programmed channels.

9. **TRACKING UP(▲) DOWN(▲) Buttons**
   Press this buttons to remove noise in playback mode.

10. **CLEAR Button**
    Use to reset the counter to "0H00M00S" or to clear the clock setting data, timer program data or to delete stored channel.

11. **SHIFT Button**
    Press this button to go to the next step while you are doing clock setting, programming, or the selection between CH and CC.

12. **VPS Button (OPTION)**
    Press this button for VPS recording.

13. **REW Button**
    To rewind the tape, press this button while in the Stop mode. To view the speeded-up picture in the reverse direction for programme search, press this button in PLAY mode. Press REW again for jet search.

14. **PLAY/x2 Button**
    Push to playback a pre-recorded tape.
    Press PLAY again to 2 time playback.

15. **F.F Button**
    To fast forward the tape, press this button while in the Stop mode. To view the Speed-up picture in the forward direction for programme search, press this button in PLAY mode. Press F.F again for jet search.

16. **REC Button**
    Press REC Button to begin recording.

17. P/S F. ADV Button
Push to stop the tape temporarily during play back or recording. Still mode will be shown during playback. In pause still mode, press to advance one frame at a time.

18. STOP Button
Stop whatever the MVCR is doing record, playback, rewind, or fast forward except timer recording.

19. SLOW Button
Press this button for 1/8 slow motion.

20. ERASE Button
Press ERASE to erase index signal.

21. INDEX Button
Press to turn on the electronic program indexing feature.
FLT prompts you to choose an index number or scan and play.

22. MARK Button
Press MARK to record index signal.

23. TIMER Button
Press this button after programming for unattended recording.

24. OTR START, LENGTH Buttons
These buttons are used for OTR recording.

25. INPUT SEL Button
Select recording signal from the tuner, Audio/Video IN JACK or simul cast.

26. MONITOR Button
Select this button when you want to check what is your channel in the TV broadcasting during playback.

27. TV−POWER Button
Press this button to turn on or off the only the MONITOR.

28. VOLUME +, −Button( )
Press this button to adjust sound level.

29. MUTE( )
Press this button to turn on or off the sound.

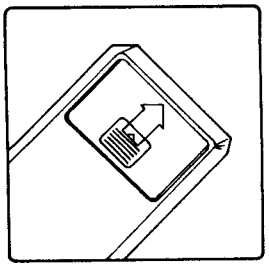
BATTERY INSTALLATION

Before you use the remote control supplied with your MVCR. install the batteries (instructions below). Most of the remote's buttons do the same things as buttons with the same names on the front of your MVCR, and you can use whichever one is more convenient at the monent
The remote control has additional buttons for controlling some of the MVCR's Special Features, and is also used for setting the clock and programming the timer.

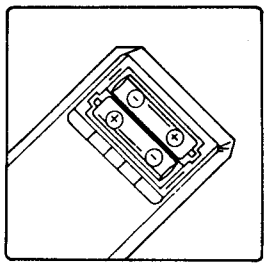
Since the remote control operates the MVCR by infrared light, it is immune to electrical and sound interference. However, you must aim the remote control directly at the MVCR. There cannot be any obstructions between them.

To install batteries in the hand unit :

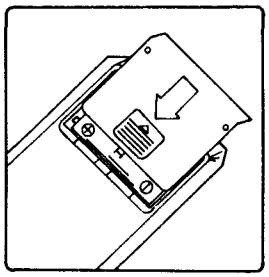
1. Turn the hand unit over and remove the cover of the battery compartment.



2. Insert the batteries so that their positive (+) ends contact the positive terminals in the battery compartment. These are marked (+) in the bottom of the compartment.



3. Replace the cover.



NOTES :
- Never place anything heavy on top of the remote control or lay it upside-down. This may accidentally depress the buttons for a long time and discharge the batteries.
- Replace the batteries when the MVCR fails to respond to remote control.
- Remove the batteries from the control if it will not be used for a month or more. This will prevent possible damage from battery leakage.

1-4. CLEANING AND LUBRICATION

1-4-1. CLEANING TAPE MECHANISM

Periodic cleaning is necessary to insure continued excellent performance of the tape mechanism. To clean the following parts, patch and slovent are available.

1. Capstan shaft.
2. All idler wheels.
3. All tape guide posts.
4. Supply and take-up reels.
5. Pinch roller.
6. Capstan belt.
7. Capstan motor pulley.

To clean video heads, full erase head, and audio/control(A/C) head, use only head cleaning kit and solvent.

Note: When cleaning video heads, move the cleaning stick in the direction of head rotation. Wiping in a vertical direction may damage the heads.

1-4-2. LUBRICATION TAPE MECHANISM

The tape transport mechanism is properly lubricated at the factory. In normal use cycles, and with average environmental conditions, additional lubrication should not be required during the first year of operation.

Depending on the frequency of use and environmental conditions, periodic lubrication may be required. When relubricating, remove old lubricant first, then sparingly apply new lubricant.
(Excessive lubricant may be transferred to other assemblies causing malfunction).

Use grease on the following parts every 1,000 hour operations.(See exploded view for location).

1. Between base pole assembly(L,R) and main base.
2. Pinch roller base, Cam.
3. Gear master cam.
4. Gear E/J drive
5. Gear L/D "L,R".
6. Base pole edge.
7. Slide main brake.
8. Braket E/J drive.
9. Sector gear.

Oil may be required for the following parts after, 1, 000 hours operation.(See exploded view for location).

Main base
1. Arm tension mould
2. Shaft reel disk "L,R" mould.
3. Shaft gear worm wheel.

Other parts which are not listed above do not be required lubrication, except part, are replaced.
Use appropriate oil or grease as indicated on exploded view.

1-5. ABBREVIATIONS

2X : Double
4.43MHz : Colour Sub Carrier

ACC : Automatic Colour Circuit
ACK : Automatic Colour Killer
ADD : Adder
AFC : Automatic Frequency Control
AFT : Automatic Fine Tuning
AGC : Automatic Gain Control
AL : Always
ALC : Automatic Level Control
AMP : Amplifier
APC : Automatic Phase Control
AUX : Auxiliary

BATT : Battery
BD : Burst Deemphasis
BE : Burst Emphasis
BH : Power Supply for Selecting VHF High Band
BL : Power Supply for Selecting VHF Low Band
BPF : Band Pass Filter

C.FG : Capstan Frequency Generator
C.SYNC : Composite Sync
CAFC : Capstan Auto Frequency Control
CAPC : Capstan Auto Phase Control
CATV : Cable TV
CAR : Carrier
CAP : Capstan
CCD : Charge Coupled Devices
CH : Channel
CHAR. : Character
CHROMA : Chrominance
CM : Capstan Motor
COMP : Comparator
CST : Cassette
C-ERR : Capstan Error
CTL : Control
C.PG : Capstan Pulse Generator
CUR.EMPH : Current Emphasis

D.FG : Drum Frequency Generator
D.O.C : Drop Out Compensator
D.PG : Drum Pulse Generator
D/A : Digital-to-Analog
D/C : Dark/Clip
D.AFC : Drum Auto Frequency Control
D.APC : Drum Auto Phase Control
DE-EMPH : De-Emphasis
DET : Detector
DEV : Deviation
DLYD : Delayed
DM : Drum Motor
DEMOD : Demodulator
D.D : Direct Drive

E-E : Electronic-to Electronic
EMPH : Emphasis
ENV : Envelope
EQ : Equalizer

F.ADV : Frame Advance
F-V : Frequency to Voltage Converter
F.FWD : Fast Forward
FH : Frequency Horizontal
FG : Frequency Generator
FM : Frequency Modulator
FSC : Sub Carrier Frequency
FWD : Forward
FC : Frequency Center
FL : Frequency Low

GEN : Generator
GND : Ground

HPF : High Pass Filter

IF : Intermediate Frequency
IR : Infrared Racrs

LED : Light Emitting Diode
LIM : Limiter
LPF : Low Pass Filter
LUMA : Luminance
LCD : Liquid Crystal Display
LNR : Linear

MIX : Mixer
MM : Monostable Multivibrator
MTS : Multi Sound Televsion System
MEM : Memory
MVCR : Monitor And VCR

N.C : No Connection
NORM : Normal

OSC : Oscillator
OTR : One Touch Recording
OSP : On Screen Programme
OSD : On Screen Display

PB : Play Back
P.C : Power Control
PG : Pulse Generator
PIF : Picture Intermediate Frequency
PLL : Phase Lock Loop
PRG : Programme

PWM : Pulse Width Modulation
PWR : Power
P/S : Pause/Still
PD : Power Detector

REG : Regulator
REC : Record
REC.SAF : Record Safety
REW : Rewind
RF : Radio Frequency
REV : Reverse
RECT : Rectifier
REF : Reference

SC : Simul-Cast
SC : Sub-Carrier
SCK : Shift Clock
SDA ; Serial Data
SIF : Sound Intermediate Frequency
SP : Standard Play
SW25Hz : Head Switching Pulse
SYNC : Synchronizing Signal
SYSCON : System Control
STB : Strobe
SI : Serial Input
SO : Serial Output
SW : Switch

TP : Test Point
TRK : Tracking

UL : Unloading

VT : Tuning Voltage
VP : Vertical Lockpluse
V-REF : Voltage Reference
V-SYNC : Vertical Sync
VCO : Video Control Oscillator
VCR : Video Cassette Recorder
VIF : Video Intermediate Frequency
VPS : Video Programming System
VHS : Video Home System
VXO : Voltage Controlled Crystal Oscillator
VSS : Voltage Super Source
VISS : VHS Index Search System

W/C : White/Clip
W/D : White/Dark

Y : Luminance

uP : Microprocessor

2. DISASSEMBLY

2-1. INSTRUMENT DISASSEMBLY

2-1-1. Top Cabinet Removal

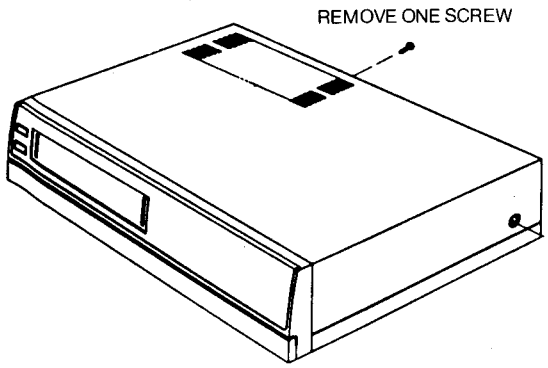


Fig. 1 Top Cabinet Removal

1. Remove three (3) screws located at the rear of the top cabinet.
2. Carefully lift the back of the top cabinet and slide it to the rear to remove.

2-1-2. Bottom Cover Removal

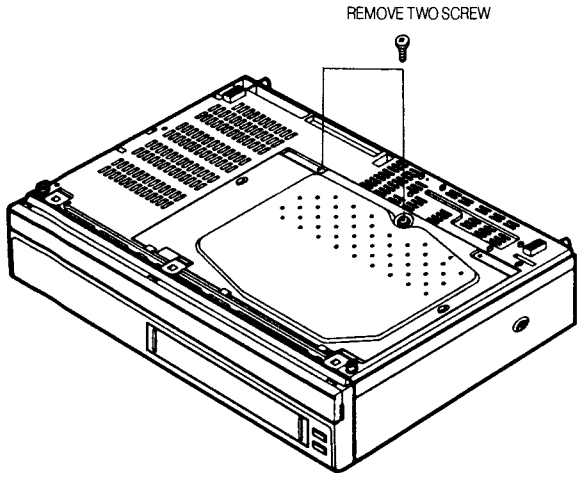


Fig. 2 Bottom Cover Removal

1. Remove two(2) screw holding bottom cover.

2-1-3. Front Panel Removal

1. Removal the top cabinet.(Fig.1)
2. Removal one (1) screw form the top of the front panel.
3. Release four (4) tabs from the front panel.
4. Release three (3) tabs from the bottom of the front panel.
5. Tilt the front panel forward to remove.

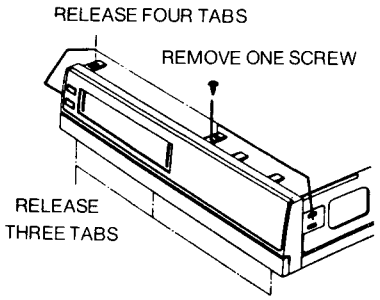


Fig. 3 Front Panel Removal

2-1-4. Main Circut Board Removal

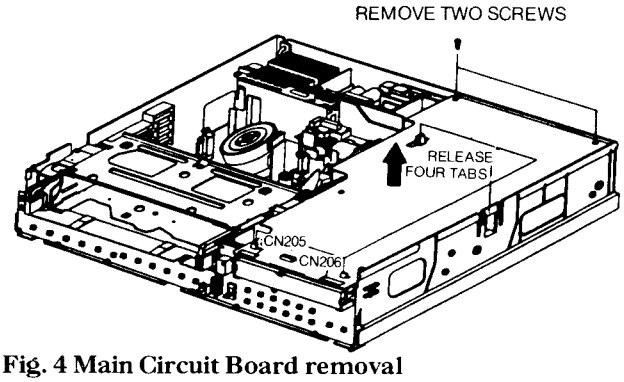


Fig. 4 Main Circuit Board removal

1. Follow the procedure for removing top cabinet (Fig.1)
2. Remove two (2) screws from the frame.
3. Release four (4) tabs from the frame.
4. Disconnect two (2) connectors (CN205. CN206) between the the main circuit board and timer circuit board.

2-1-5. Function Switch Circuit Board Removal

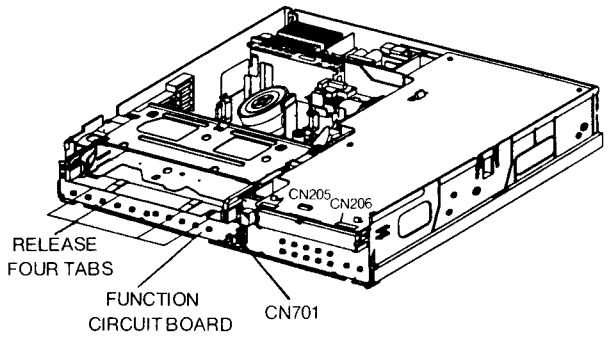


Fig. 5 Function Switch Circuit Board Removal

1. Follow the procedure for removing the panels. (Figs. 1 and 3)
2. Release tabs from the frame.(Fig.5)
3. Remove four (4) tabs holding the function switch circuit board.
4. Disconnect CN701 from the timer circuit board.

2-1-6. Timer Input Key Circuit Board Removal

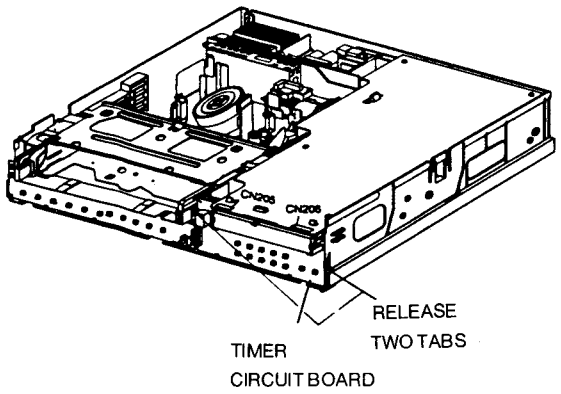


Fig. 6 Timer Input Key Circuit Board Removal

1. Follow the procedure for removing the panels. (Fig.1 and 3)
2. Release two (2) tabs holding circuit board from the frame.

2-1-7. Pre-Amp Circuit Board Removal

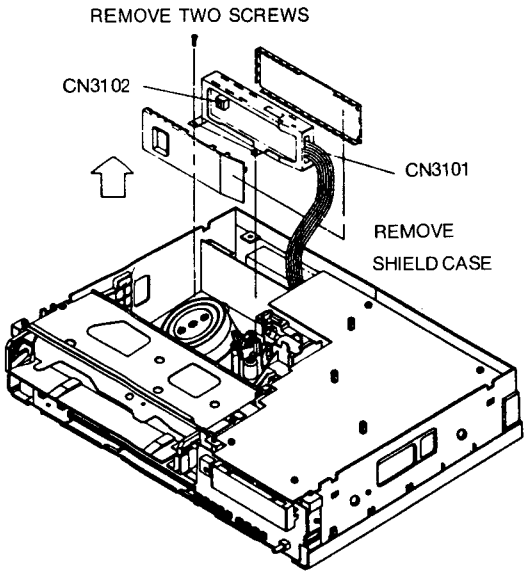


Fig. 7 Pre-Amp Circuit Board Removal

1. Follow the procedure for removing the top cabinet(Fig.1), bottom cover(Fig.2) and front panel (Fig.3).
2. Remove two (2) screws holding the Pre-Amp from the frame.
3. Disconnect the one (1) connector on the Pre-Amp circuit board.
4. Pull out the Pre-Amp ass'y in the direction of the arrow and then release shield case.

2-1-8. Regulator Circuit Board Removal

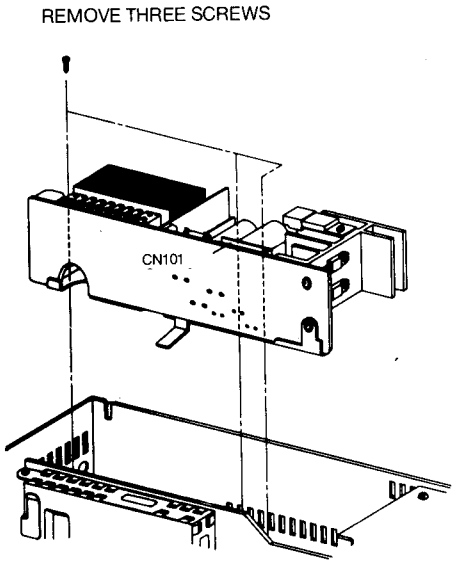


Fig. 8 Regulator Circuit Board Removal

1. Follow the procedure for removing the top cabinet(Fig.1)
2. Remove the regulator cover and three (3) screws from the frame.
3. Disconnect one (1) connector (CN101) on the main circuit board.
4. Taking care of the cable assemblies, lift up the regulator circuit board upward to remove.

2-2. MECHANICAL DISASSEMBLY

Tape Transport Mechanism Identification

(Top Side)

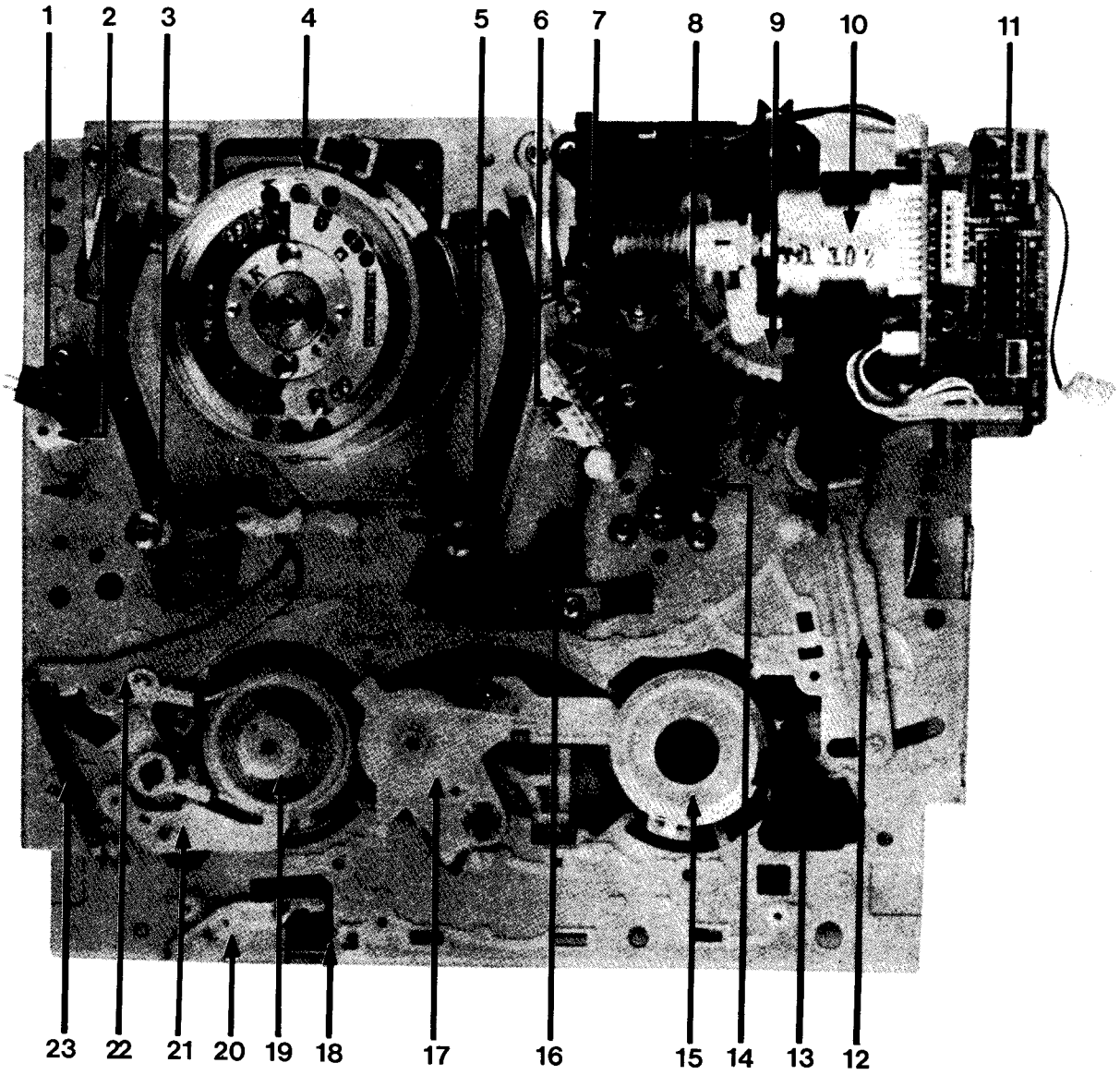


Fig. 9 Tape Trantport Mechanism-Top View

1. F/E HEAD
2. SUPPLY ROLLER
3. POLE BASE "L" ASS'Y
4. CYLINDER ASS'Y
5. POLE BASE "R" ASS'Y
6. A/C HEAD ASS'Y
7. CAM ADJUST
8. PINCH ROLLER LEVER ASS'Y
9. MASTER CAM GEAR
10. L/D UNIT ASS'Y
11. P.C.B JOINT ASS'Y
12. BRAKE LEVER CAM ASS'Y
13. SUB BRAKE "R"
14. REVIEW ARM ASS'Y
15. REEL DISK(R)
16. LED ASS'Y
17. SUB IDLER ASS'Y
18. REC SPRING S/W
19. REEL DISK(L)
20. REC LEVER S/W
21. SUB BRAKE "L"
22. TENSION ARM ASS'Y
23. TENSION SPRING

(Bottom Side)

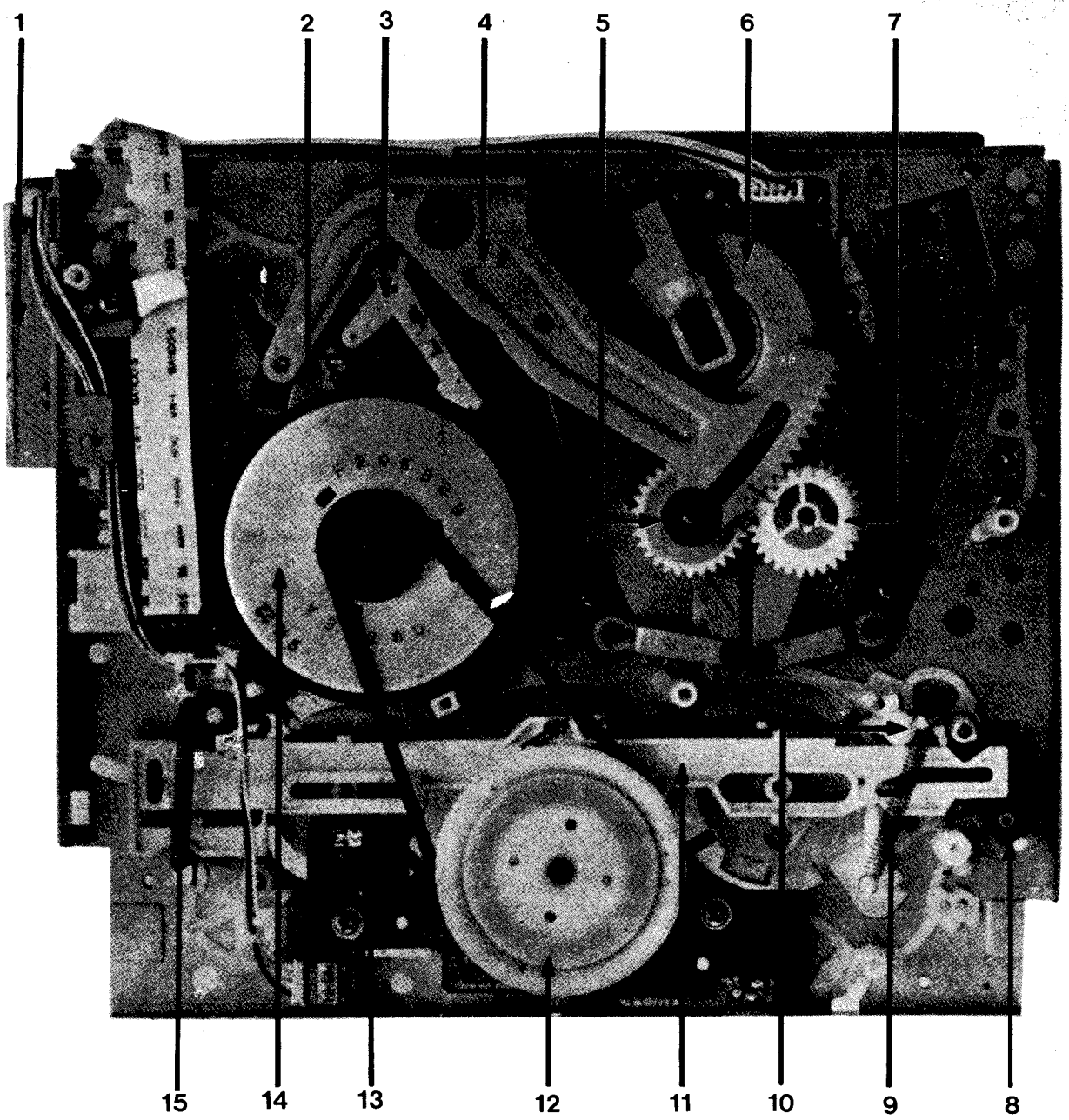


Fig. 10 Tape Transport Mechanism-Bottom View

1. EJECT DRIVE BRACKET
2. D.D CAPSTAN B/R SPRING
3. D.D CAPSTAN BRAKE
4. SECTOR GEAR ASS'Y
5. LOADING GEAR "R" ASS'Y
6. CYLINDER MOTOR
7. LOADING GEAR "L" ASS'Y
8. TENSION CONTROL LEVER
9. SUB SPRING "L"
10. MAIN BRAKE "L"
11. MAIN BRAKE SLIDE ASS'Y
12. CLUTCH ASS'Y
13. REEL P.C.B ASS'Y
14. D.D CAPSTAN MOTOR
15. SUB SPRING "R"

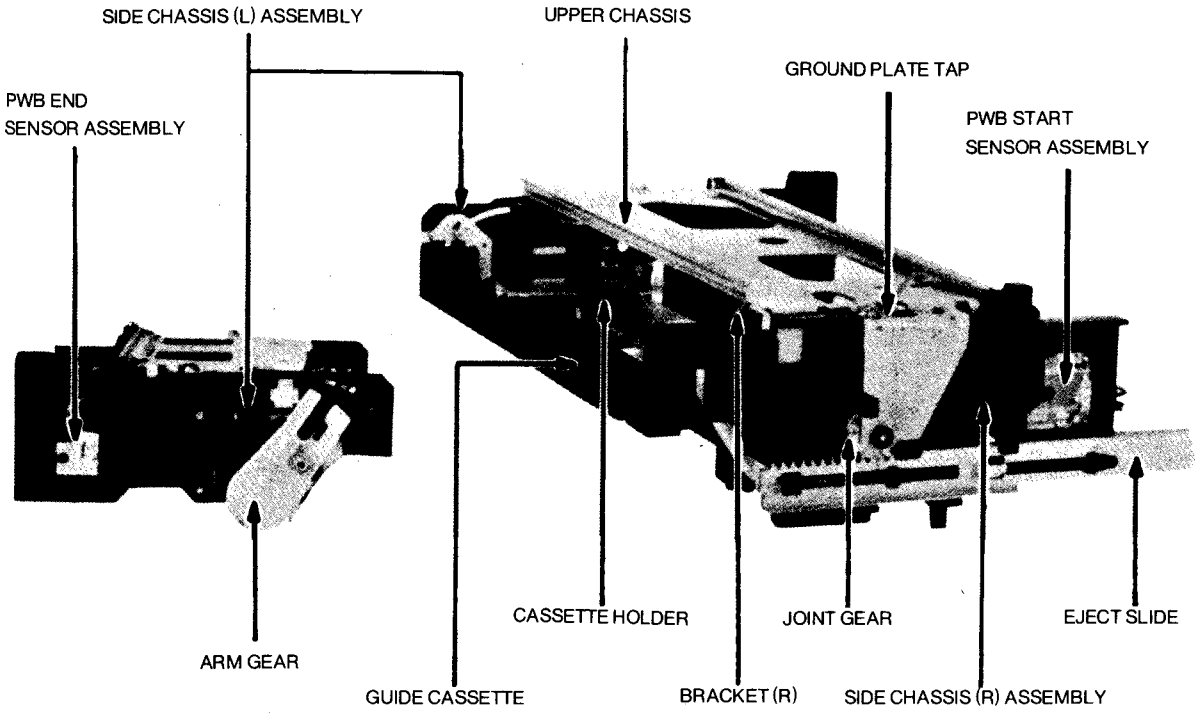


Fig. 11 F/L Housing Assembly Identification

2-2-1. Housing Assembly Removal

1. Follow the procedure for removing the cover.(See Figs. 1 to 3).
2. Disconnect the housing sensor connector from the PWB Deck Joint.
3. Remove four(4) screws holding the housing assembly and the Main Base.
4. Push the housing assembly in the direction arrow A and then lift up in the direction of arrow B..

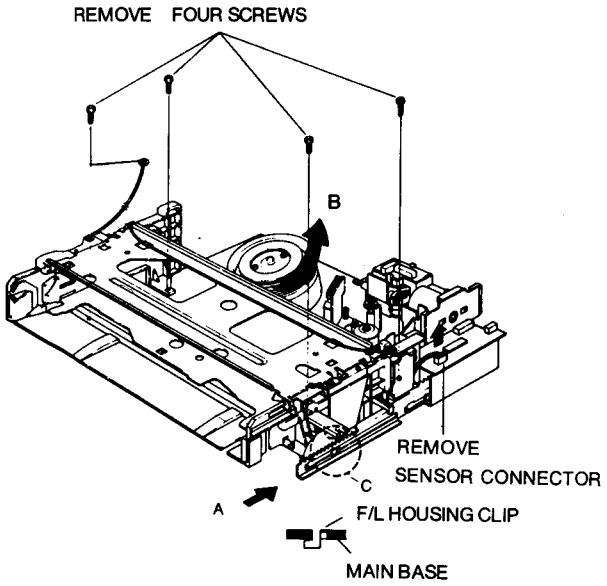


Fig. 12 Housing Assembly Removal

2-2-2. PWB Sensor (S) Assembly Removal

1. Push the wire toward A, B arrows and then remove it.
2. Push apart clips shown in C direction and remove P.C.B. in direction D.

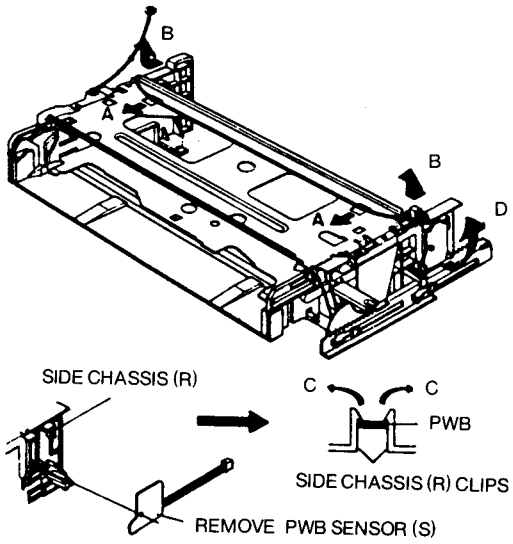


Fig. 13 PWB Sensor (S) Assembly Removal

2-2-3. PWB Sensor (E) Assembly Removal

1. Push apart clip as shown in direction A and remove P.C.B. in direction C.

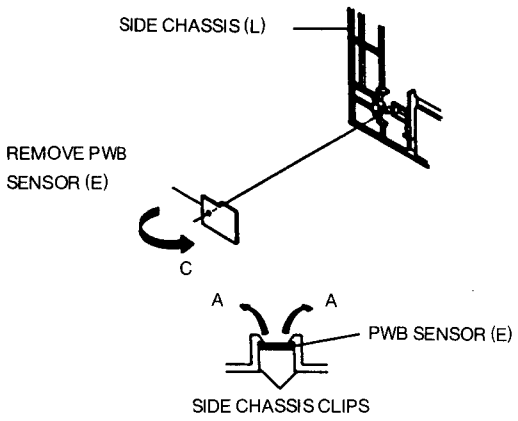


Fig. 14 PWB Sensor (E) Assembly Removal

2-2-4. Sub Assembly Removal

1. Remove two (2) screws holding the upper chassis and remove the ground wire assembly and the ground plate top.
2. Lift the upper chassis toward A.
3. Lift the assembly cassette holder toward E.
4. Push the eject slide toward E to the end, lift it in the direction of arrow C.
5. Release clip on right side of chassis in direction D and remove the Joint Gear.

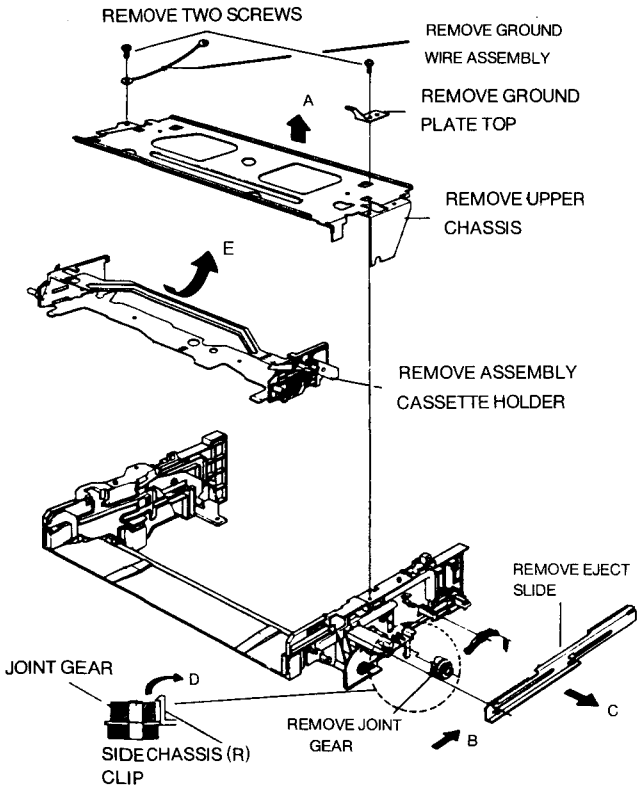


Fig. 15 Sub Assembly Removal

2-2-5. Side Arm Assembly Removal

1. Release the clip as shown in A and B.
2. Lift chassis right as shown in C.
3. Release the clip as shown in D and E.
4. Remove left side chassis as shown in F.

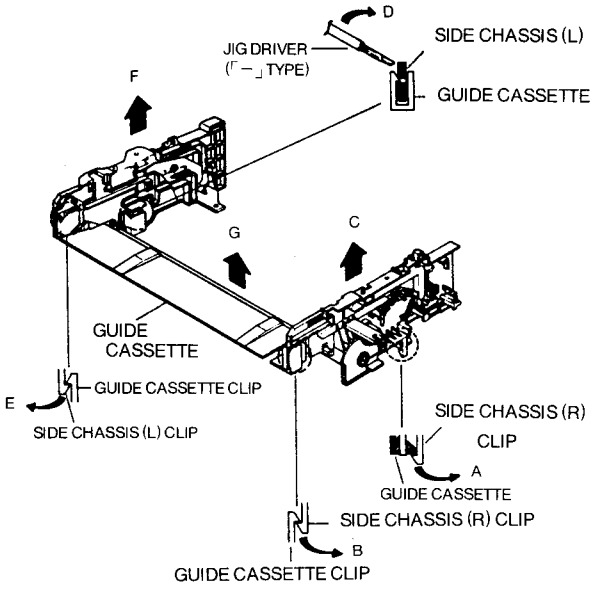


Fig. 16 Side Arm Assembly Removal

2-2-6. Arm Gear Removal

1. Remove eject spring by prying out center.
2. Remove spring tension arm (R) from the hook of side arm (R).
3. Remove the arm gear.

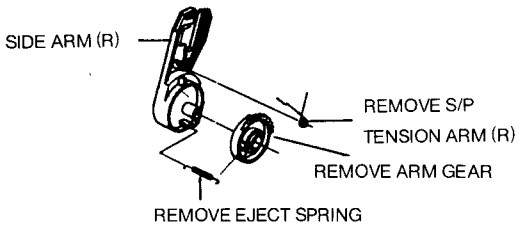


Fig. 17 Arm Gear Removal

2-2-7. Cassette Holder Assembly Removal

1. Remove the spring the holder L/R and lever LID L/R and remove the lever LID.
2. Remove the key cassette from the side holder (R) and remove the spring key cassette from the key cassette.
3. Lift the plate cassette upper toward A after taking off the hook of side holder L/R.
4. Lift up the side holder L/R from the cassette holder.

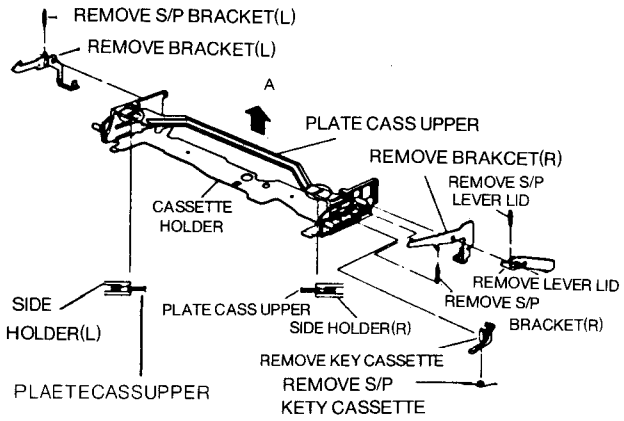


Fig. 18 Cassette Holder Assembly Removal

2-2-8. Side Chassis (L) Assembly Removal

1. Release light shutter spring from side chassis.
2. Remove light shutter after releasing tab as shown in A.
3. Remove the mask cam lever in the director of arrow B from the side chassis(L).

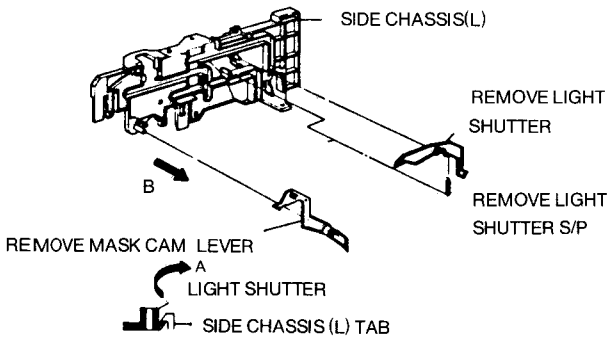


Fig. 19 Side Chassis (L) Assembly Removal

NOTE ; To re-assemble reverse procedure.

2-2-9. Joint Gear, Arm Gear and Eject Slide Assembly

1. Assemble the assembly point of the joint gear and the arm gear.
2. Assemble the joint gear with the eject slide as Fig. 20.

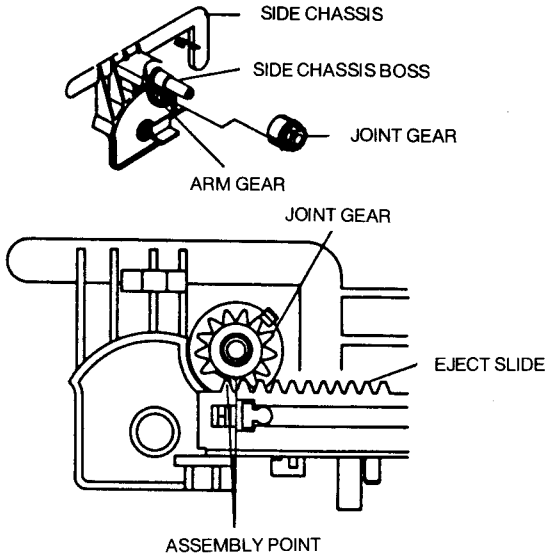


Fig. 20 Joint Gear, Arm Gear and Eject Slide Assembly

2-2-10. Deck Assembly and Assembly of F/L Housing Assembly

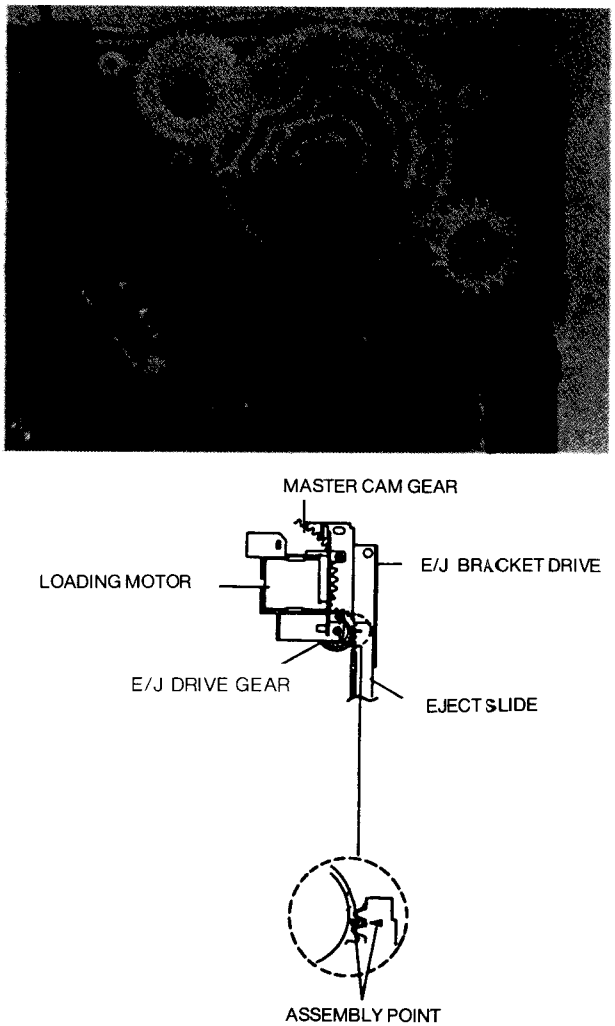


Fig. 21 Housing Assembly Point

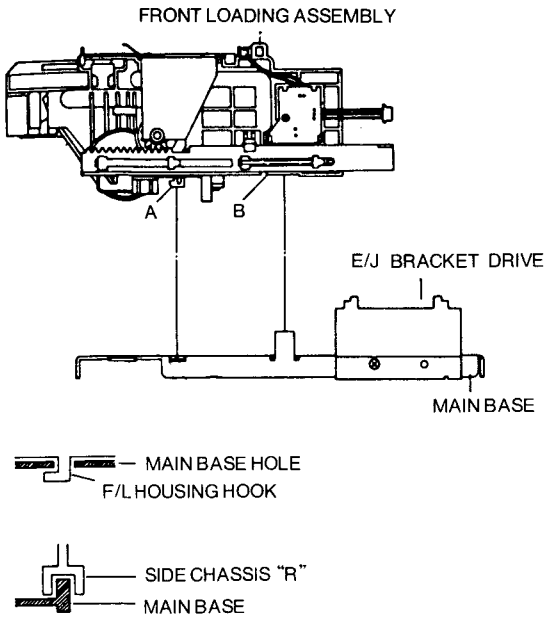


Fig.22 Mechanism Chassis Assembly Removal

NOTE : Perform this procedure with mechanism in the eject position.

1. Pull the eject slide gear and assemble the point of E/J Drive Gear and E/J Slide Gear.(Fig.21)
2. While holding cassette holder in the eject position, align the A and B assembly points as shown in 22.
3. Tighten two(4) screws.

NOTE : Recheck A and B position after reinstallation, if incorrect repeat above.

*** Operating the MVCR without Housing Assembly.**

1. Connect a jumper to short circuit shortly between pin 1(ground) and pin 3 (start sensor) of CN6202 on DECK JOINT.
2. After loading, function key is available to be used to select desired mode.

*** Operating the MVCR without inserting a cassette tape.**

1. Remove the Housing upper chassis.
2. Push the cassette holder, while hiding the both sensors of LED IR.
3. After loading, function key is available to be used.

2-2-11.Cylinder Assembly Removal

CAUTION : Take extreme care when removing the upper cylinder. Do not touch the video head tips located at the upper cylinder during servicing.

Follow the Procedure for Removing

1. Remove the top cover.(See Fig. 1)
2. Remove the bottom cover.(See Fig. 2)
3. Remove the cylinder ass'y from the main base.
4. Remove two(2) screws from the upper cylinder ass'y.
5. Unsolder PWB-Upper cylinder and then lift upper cylinder.
6. Remove screw from lower cylinder and detach TR holder ass'y.
7. Remove two(2) screws from the motor rotor, then remove it.
8. Remove three(3) screws from the motor stator and remove it.

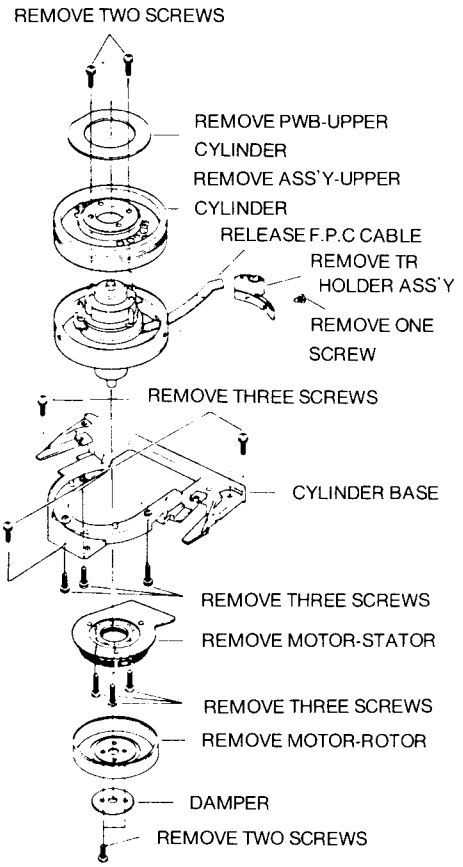


Fig.23 Cylinder Assembly Removal

2-2-12. Upper Cylinder Assembly Removal

1. Unsolder the PWB upper cylinder from the upper cylinder ass'y.
2. Remove two(2) screws from the upper cylinder ass'y and remove it.

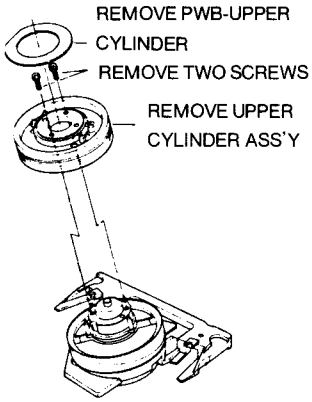


Fig.24 Upper Cylinder Assembly Removal

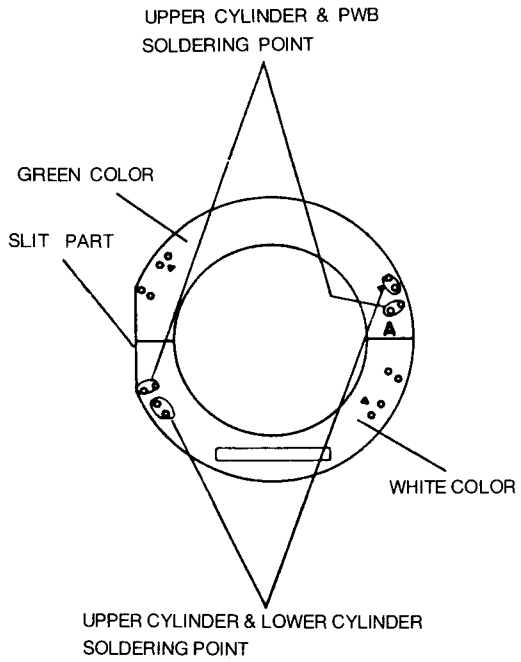


Fig.25 PWB Upper Cylinder

* Upper Cylinder Ass'y Assembly

1. Fix the slit part of upper cylinder PWB to CH1 head tip of PCB(green) on bottom side.(Fig.26)
2. Fix the CH1 head tip (green) on bottom side of upper cylinder ass'y to the green PCB of lower cylinder ass'y(Fig.27) and then solder it to point B.
3. Tighten two (2) screws.

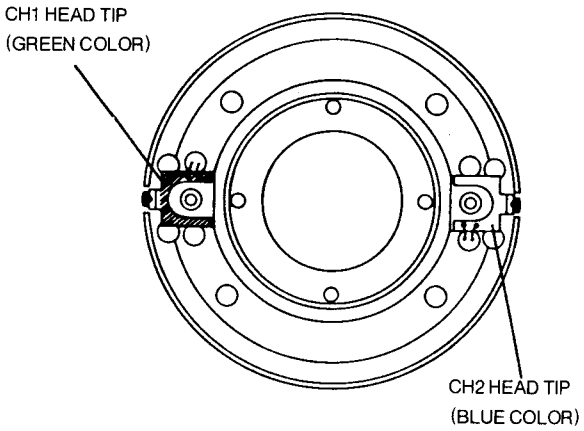


Fig.26 Upper Cylinder Bottom View

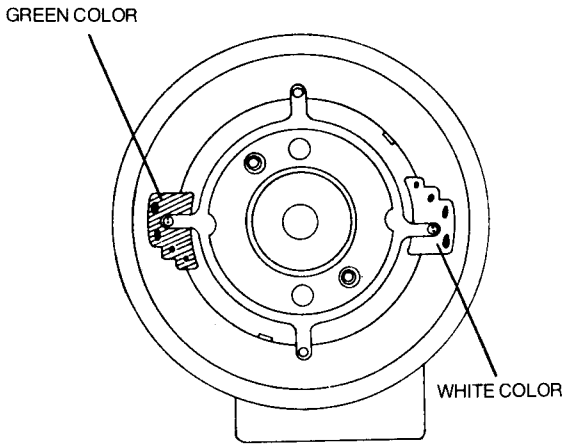


Fig.27 Lower Cylinder Top View

2-2-13. Lower Cylinder Assembly Removal

1. Lift up the lower cylinder from the cylinder base.

NOTE : Align cylinder base pin before reinstalling

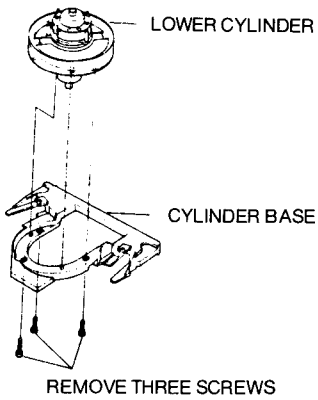


Fig.28 Lower Cylinder Assembly Removal

2-2-14. Cylinder Motor Assembly Removal

1. Remove two (2) screws from the motor rotor, then remove rotor.

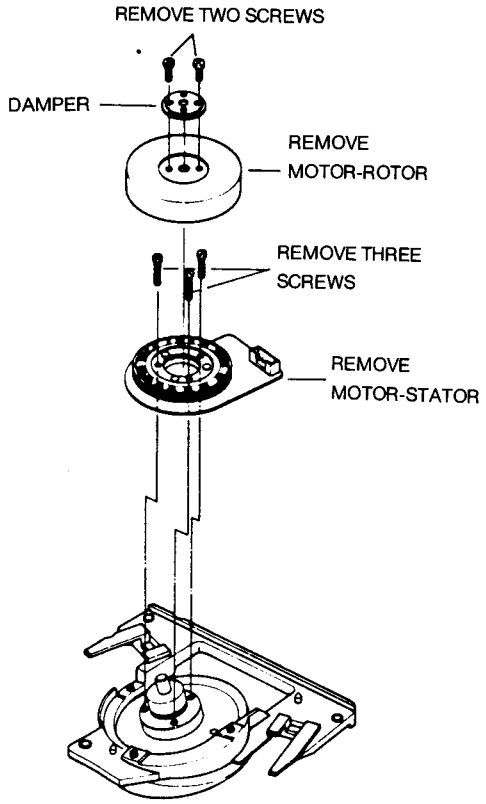


Fig.29 Cylinder Motor Assembly Removal

NOTE: Mark rotor position to insure correct phase orientation upon reinstallation.

2. Remove three (3) screws from the motor stator and remove it from the lower cylinder.

***Motor rotor Assembly**

1. Tighten 2 screws while fixing the hole of cylinder bush and rotor (Fig. 30)

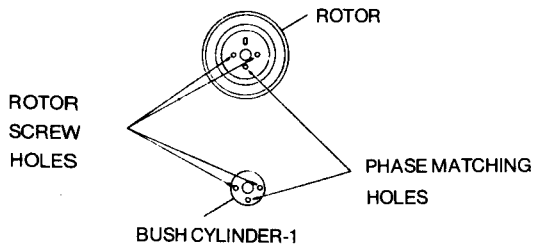


Fig.30 Motor Rotor Assembly

2-2-15. Cylinder Assembly Removal from Main Base

1. Remove three(3) screws securing the cylinder base and main base.
2. Lift the cylinder base to remove.

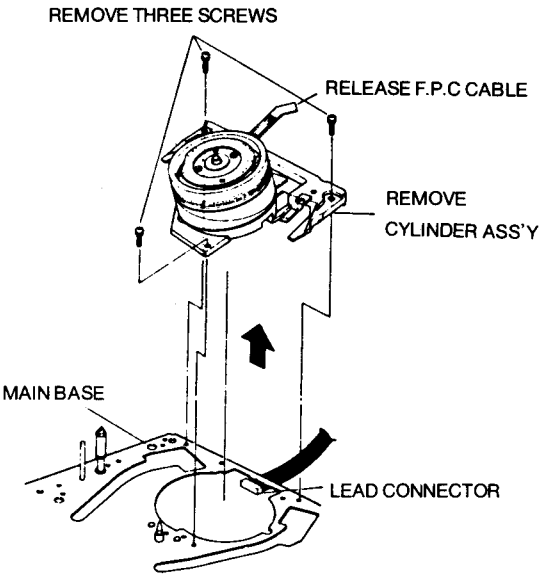


Fig.31 Cylinder Assembly Removal

2-2-16. Loading Unit Assembly and E/J Drive Bracket Removal

1. Remove the top cabinet.(see Fig. 1)
2. Remove the screw from the PWB joint, and then lift up the PWB joint.
3. Remove three (3) screws of loading unit assembly.
4. Lift up the loading unit assembly.
5. Remove two (2) screws securing eject drive bracket from the side of main base.
6. Lift to remove.

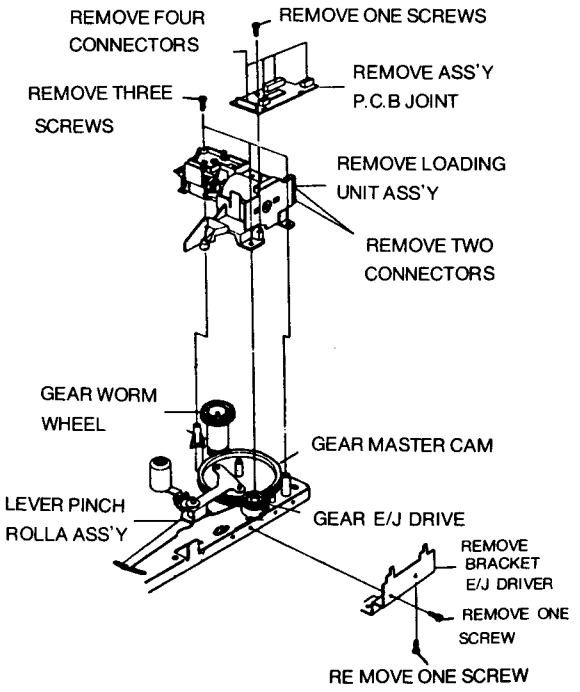


Fig.32 Loading Unit Assembly and E/J Drive Bracket Removal

2-2-17. Brake Lever Cam Assembly Removal

1. Remove the slit washer from pinch roller stud.
2. Lift up the brake lever cam assembly.

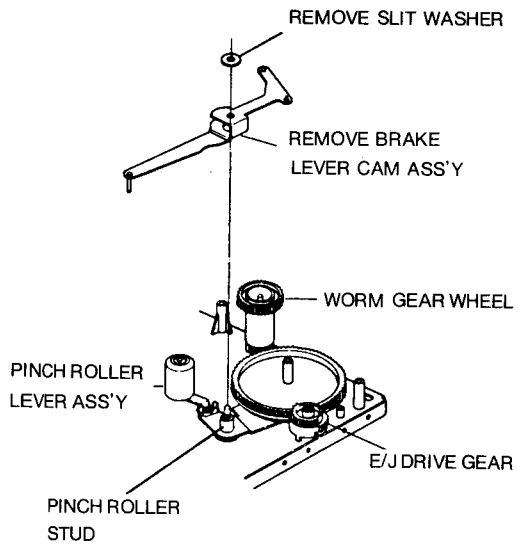


Fig.33 Brake Lever Cam Assembly Removal

2-2-18. Worm Gear Wheel, Master Cam and Eject Drive Gear Removal

1. Lift up the worm gear wheel.
2. Lift up the eject drive gear.
3. Lift up the master cam gear.

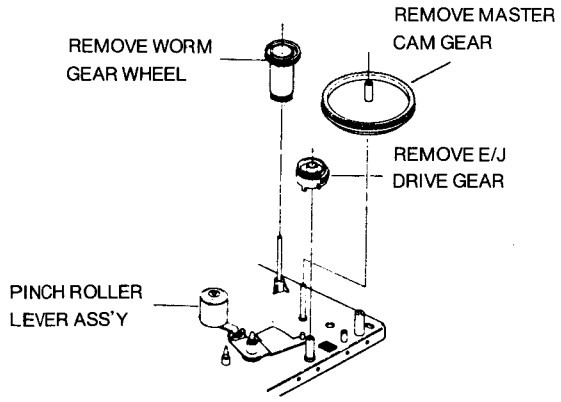


Fig.34 Worm Gear Wheel, Master Cam and Eject Drive Gear Removal

2-2-19. Pinch Roller Lever Assembly Removal

1. Lift up the pinch roller assembly.
2. Remove the spring pinch roller.

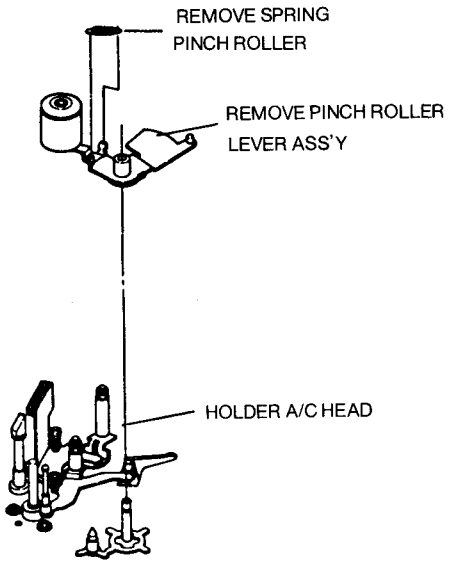


Fig.35 Pinch Roller Lever Assembly Removal

2-2-20. Sector Gear Removal

1. Remove two(2) slit washers securing sector gear stud and loading gear R "from the bottom side of main base.
2. Place loading gears in eject position. Lift up the sector gear.

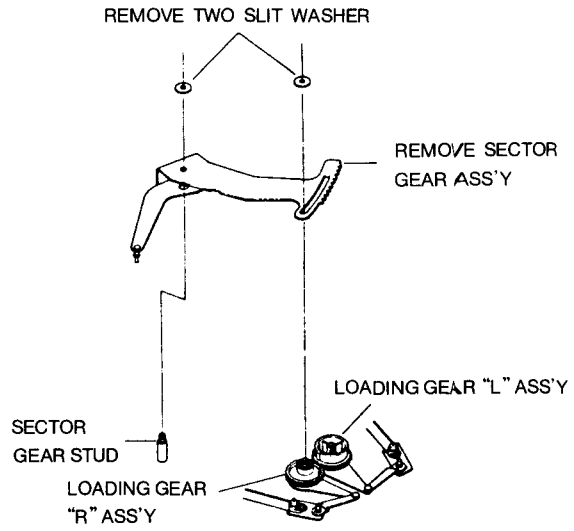


Fig.36 Sector Gear Removal

2-2-21. Loading Gear L/R Removal

1. Release the tab securing the loading gear ass'y. to the loading gear arm from the bottom.
2. Lift up the loading gear L/R to remove.

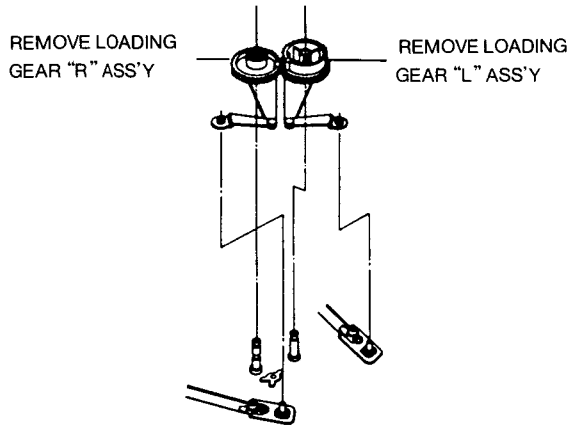


Fig.37 Loading Gear L/R Removal

2-2-22. Reel Disk "R" Removal

1. Remove the sub brake "R".
2. Release locking tab.
3. Lift up the reel disk.
4. Remove the plain washer.

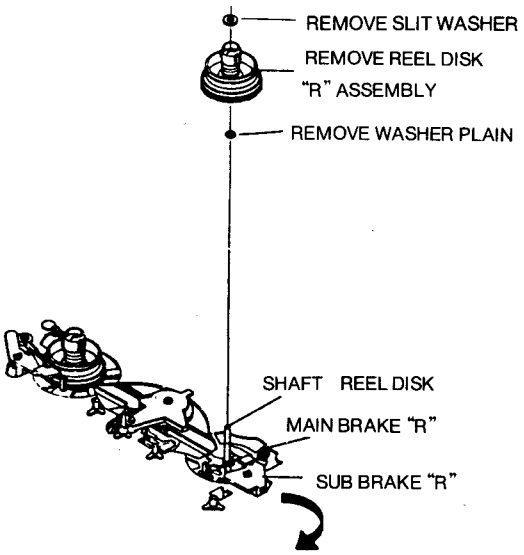


Fig.38 Reel Disk "R" Removal

2-2-23. Reel Disk "L" Tension Band & Tension Arm Removal

1. Take off the tension arm spring.
2. Align tension arm adjustment with slot in the tension band, then pull up to remove.
3. Remove the tension band.
4. Lift up the reel disk "L" after removing the sub brake "L"in the direction of arrow.
5. Remove the plain washer.

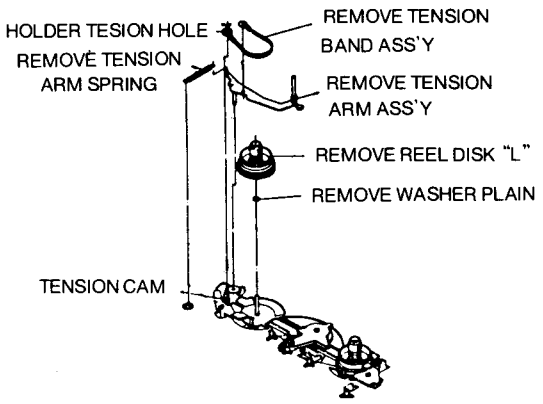


Fig.39 Reel Disk "L" Tension Band & Tension Arm Removal

2-2-24. Sub Brake L/R and REC Lever Switch Removal

1. Remove the sub brake spring "L".(Refer to the main brake slide removal)
2. Remove the sub brake spring "R".(Refer to the main brake slide removal)
3. Remove the REC lever switch.
4. Release tab from beneath chassis. Lift up the sub brake L/R.
5. Release tab from beneath chassis. Remove the REC lever switch.

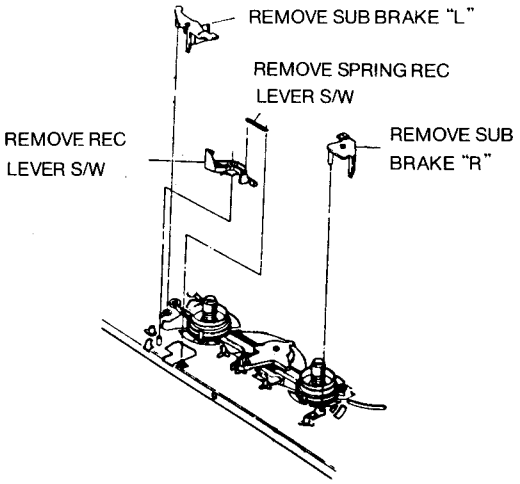


Fig.40 Sub Brake L/R and REC Lever Switch Removal

2-2-25. Main Brake L/R and tension Lever Control Removal

1. Remove Capstan belt.
2. Remove slit washer securing clutch ass'y
3. Release main slide yellow spring by unhooking from supply reel tab.
4. Release four (4) tabs and remove main slide.
5. Release tab and remove the tension lever control. Refer to Fig. 41.
6. Release tab and remove main brake left/right.

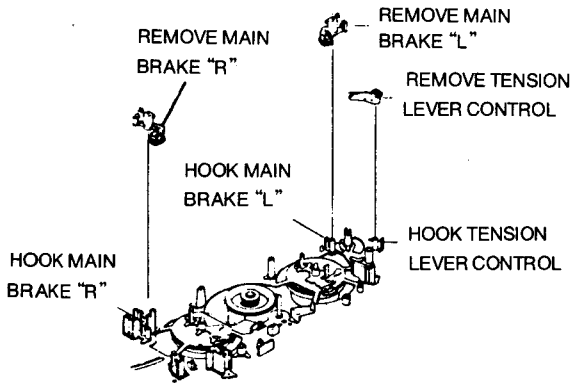


Fig.41 Main Brake L/R and Tension Lever Control Removal

2-2-26. Capstan Motor and Capstan Motor Brake Removal

1. Remove the D.D capstan brake spring. Turn assembly to release tab.
2. Lift up the D.D capstan brake to remove.
3. Remove capstan cable from PCB.
4. Remove three (3) screws holding the capstan motor from the main base.
5. Remove the capstan motor belt from the capstan motor pulley and the clutch ass'y. Remove motor.

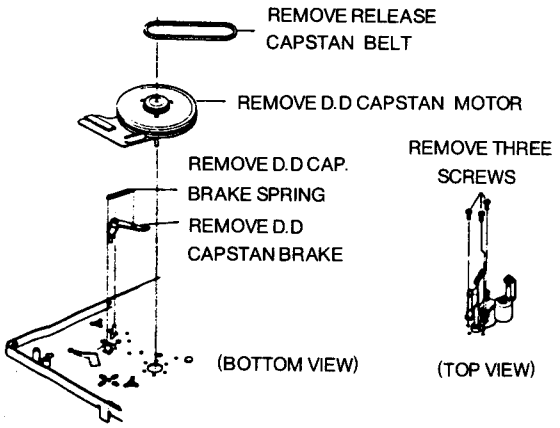


Fig.42 Capstan Motor and Capstan Motor Brake Removal

2-2-27. Idler Clutch and Shift Lever Removal

1. Remove the slit washer.
2. Remove the clutch assembly.
3. Pull the shift lever up toward vertical, push forward chassis back, then up to remove.

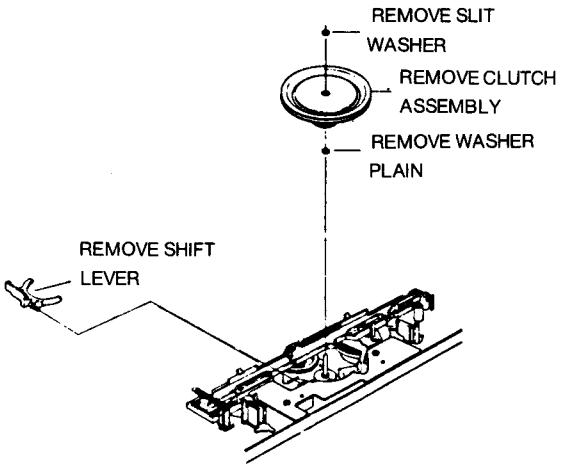


Fig.43 Idler Clutch and Shift Lever Removal

2-2-28. Main Brake Slide Removal

1. Remove the sub "L" spring.
2. Remove the main slide spring from supply reel tab.
3. Lift up the main brake slide after releasing the securing tabs.
4. Remove the idler shift spring after releasing the securing tabs.

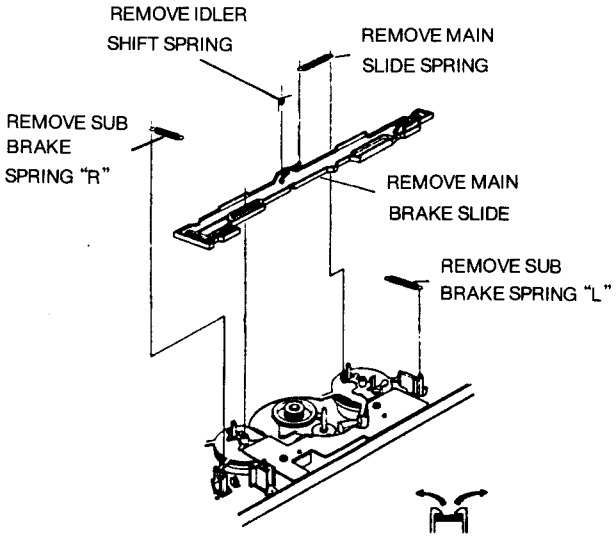


Fig.44 Main Brake Slide Removal

2-2-29. PWB Reel Removal

1. Disconnect the lead connector assembly.
2. Remove the two (2) screws.
3. Lift up the PWB reel.

NOTE : When reinstalling PWB, pull REC safety switch arm back.

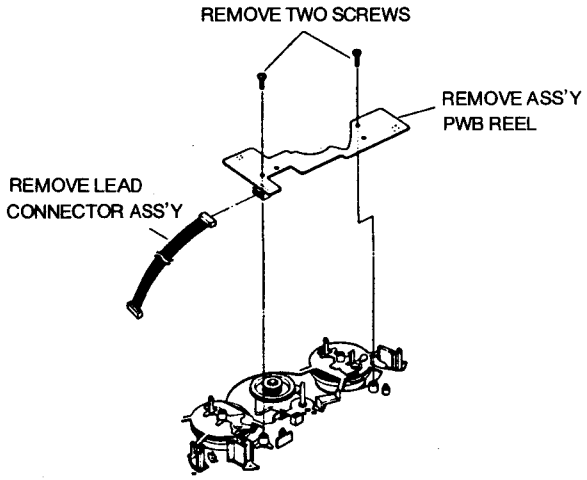


Fig.45 PWB Reel Removal

2-2-30. Idler Sub Assembly Removal

1. Remove the slit washer.
2. Lift up the idler sub assembly.

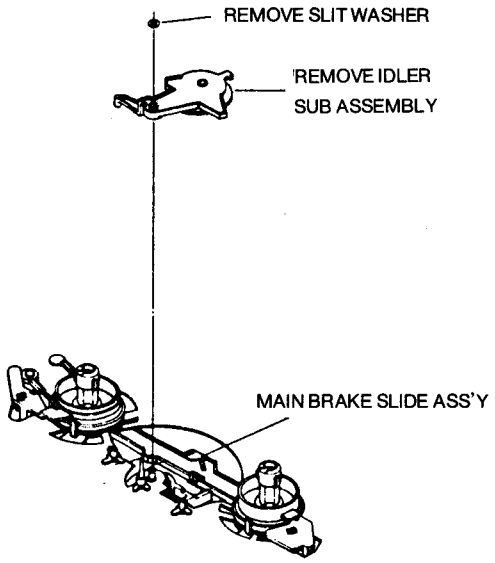


Fig.46 Idler Sub Assembly Removal

2-2-31. Assembly LED Removal

1. Disconnect the lead connector assembly.
2. Remove the one (1) screws.
3. Lift up the LED holder.

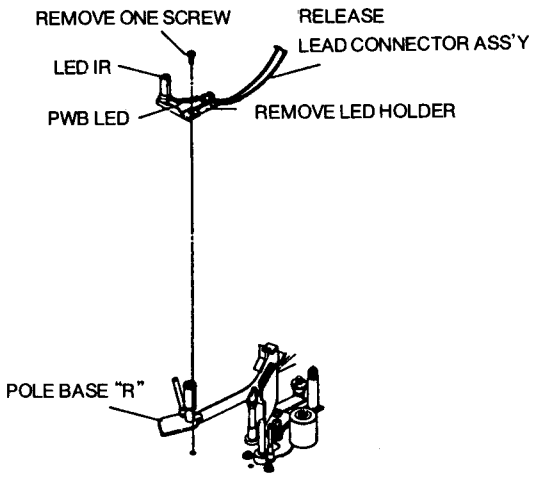


Fig.47 Assembly LED Removal

2-2-32. Worm Gear Positioning (Eject Mode)

* Assemble in the eject mode, rotate worm gear full counter clockwise.

2-2-33. Pinch Roller Assembly and Master Cam Gear Assembly

1. Fasten pinch roller ass'y. to pinch roller stud.
2. Reinstall master cam gear with pinch roller ass'y. in the eject mode. Refer to Fig.48.

NOTE : Align the assembly pin with the Master Cam gear alignment hole.

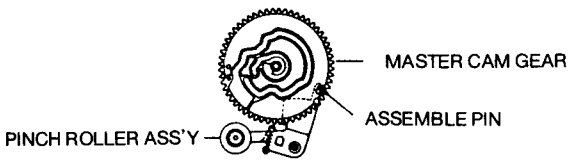
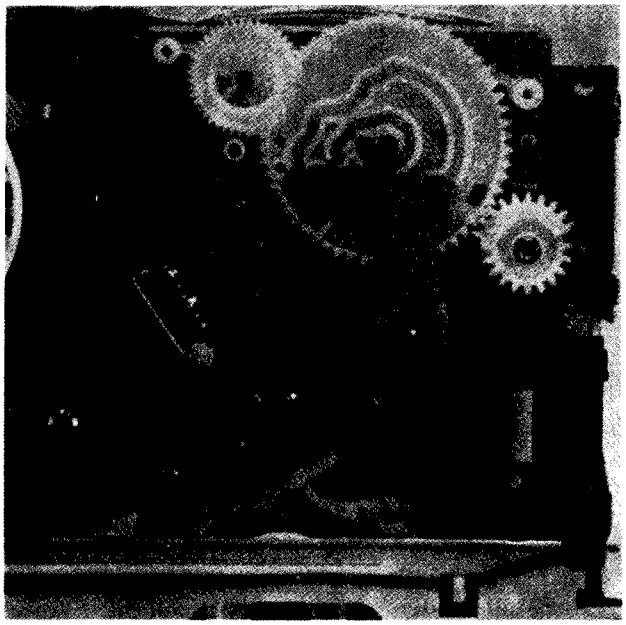


Fig.48 Pinch Roller Assembly and Master Cam Gear Assembly

2-2-34. Brake Cam Lever, Eject Drive Gear and Master Cam Gear Assemble

1. Assemble the brake cam ass'y. on the pinch lever stud as in Fig.49.
2. Assemble master cam gear with the brake cam lever ass'y. in eject mode.
3. Assemble gear E/J (eject) drive to stud as shown in Fig.49, secure with slit washer.

NOTE: Align arrows on master cam & eject drive gear.



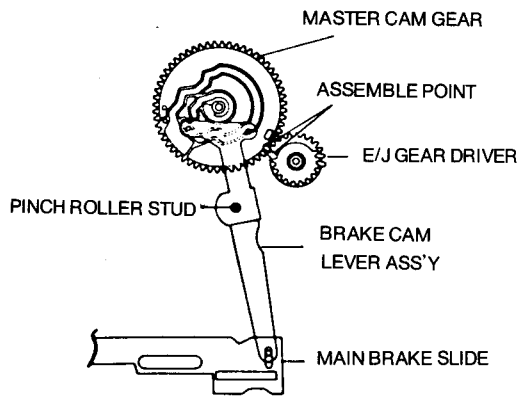


Fig.49 Brake Cam Lever, Eject Drive Gear and Master Cam Gear Assembly

2-2-35. Ass'y Loading Unit and Master Cam Gear Assembly

1. Align master cam hole with chassis hole.
2. Align program switch arrows, push brake tension lever to align tracking pin as shown in Fig.50.
3. Align master cam & eject drive gear arrows.
4. Reinstall loading gear ass'y.

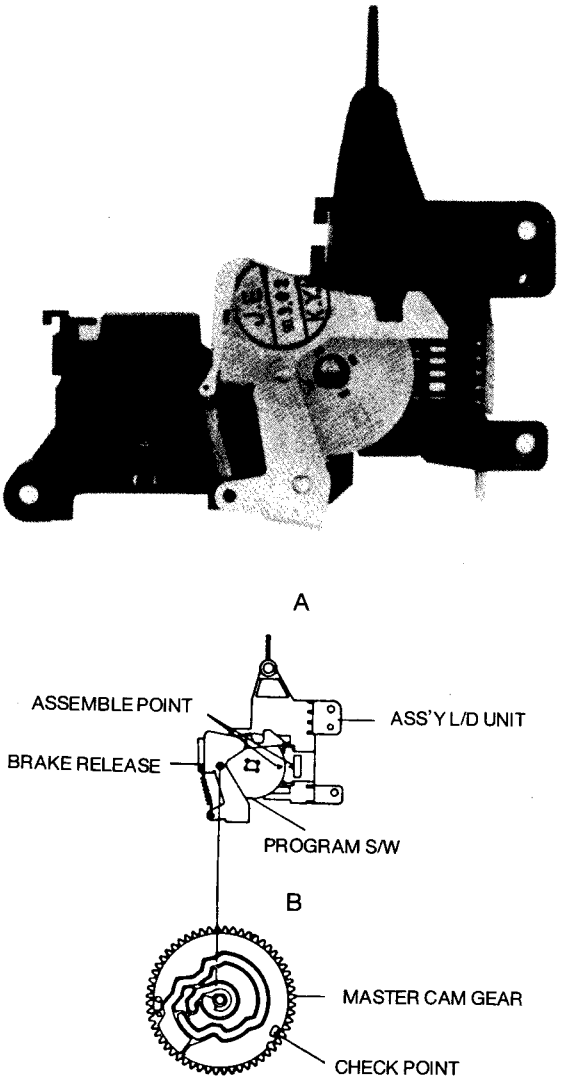


Fig.50 Ass'y Loading Unit and Master Cam Gear Assembly

2-2-36. Sector Gear and Loading Gear Assembly

1. Reinstall the loading gear L/R assemblies in the eject mode while align the timing marks. (Fig.51)
2. Install sector gear and align with timing mark on the supply side loading gear. (Fig.52)
3. Secure with slit washers.

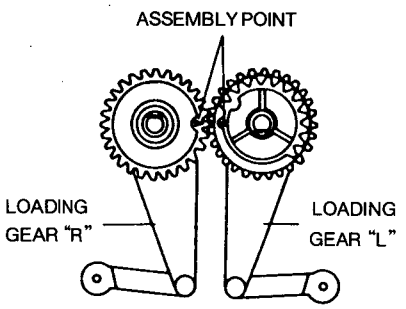
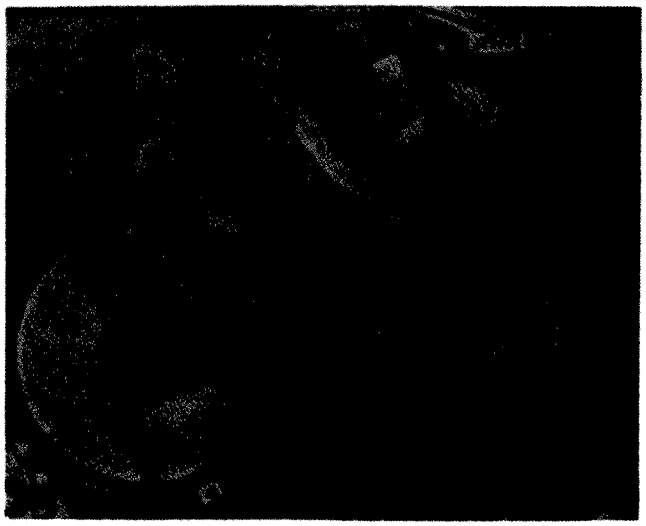


Fig.51 Loading Gear L/R Assembly point



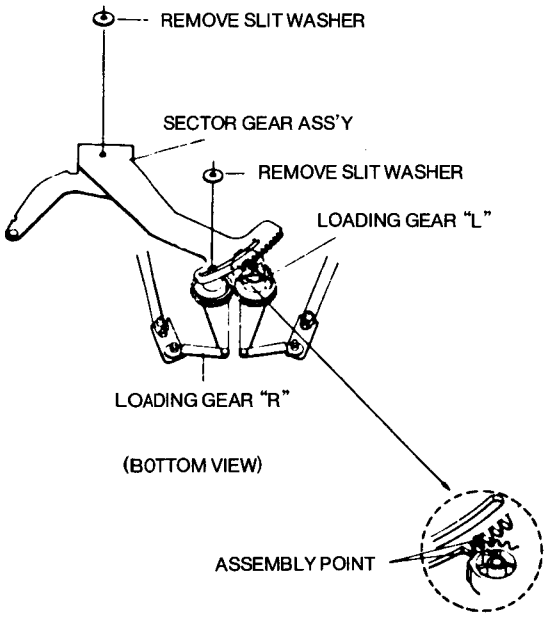


Fig.52 Sector Gear and Loading Gear Assembly

2-2-37. Pole Base Assembly Removal

1. Loosen one (1) screw from bottom of pole base
2. Slide and remove retainer clips.
3. Remove pole base ass'y
4. Install in reverse order.

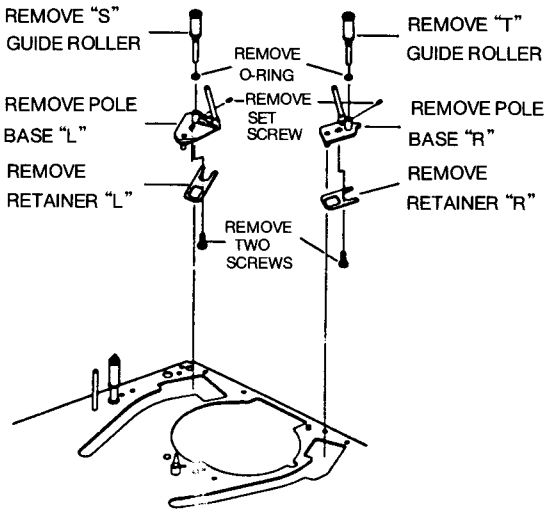


Fig.53 Pole Base Assembly Removal

2-2-38. Audio Control Head Assembly Removal

1. Remove the nylon nut holding A/C head stud.
2. Remove three (3) screws and spring.
3. Lift up the A/C head assembly.
4. Remove A/C head holder from the stud.
5. Lift up the spring torsion A/C.

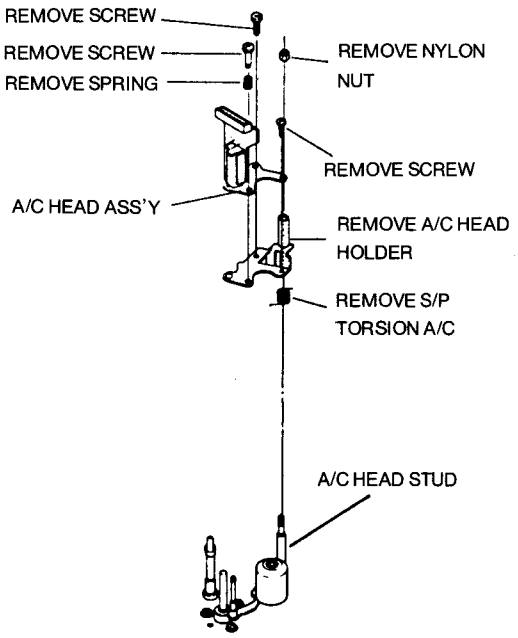


Fig.54 Audio Control Head Assembly Removal

2-2-39. Review Arm Assembly Removal

1. Remove the nylon nut holding the review arm stud.
2. Lift up the washer plain.
3. Lift up the review arm assembly.
4. Remove the review arm spring.

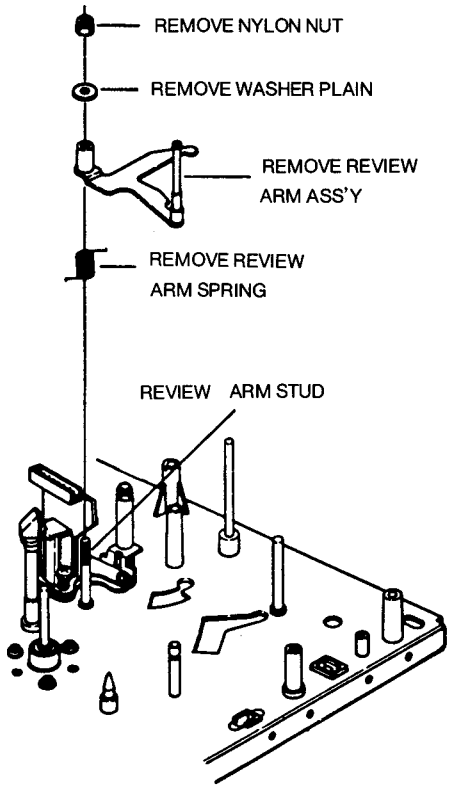


Fig.55 Review Arm Assembly Removal

2-2-40. Full Erase Head Removal

1. Disconnect the lead connector assembly from the Full Erase Head.
2. Remove the screw holding the Full Erase Head and the main base.
3. Lift up the Full Erase Head.

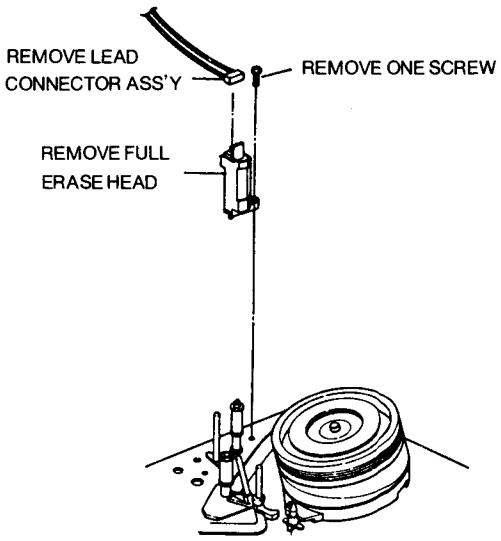


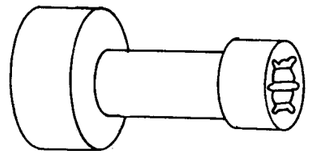
Fig.56 Full Erase Head Removal

3. MECHANICAL ADJUSTMENT

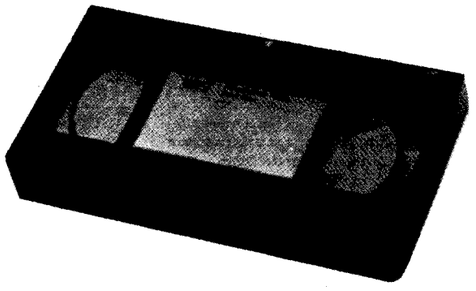
3-1. MECHANICAL ADJUSTMENT TOOLS

NO	JIG ITEM	CODE NO.	SPECIFICATION	DESCRIPTION	SKETCH NO.
1	TORQUE HEAD GAUGE	68140-100-100	COMMON ; LONG	; Use for torque adjustment of Take up/Supply Reel.	A
2	ALIGNMENT TAPE	68140-100-207 68140-100-208 68140-100-209 68140-100-210 68140-100-211	PAL ; SR 1-2 PAL ; SR 2-2 PAL ; SVJ-2 PAL ; SHR2-2 PAL ; SHVJ-2	; LION PATTERN ; 6KHz ; COLOR BAR ; 1kHz ; PROGRAM(MONO) ; COLOR BAR(Hi-Fi) ; L-1KHz, R-400Hz ; PROGRAM(Hi-Fi)	B
3	BACK TENSION CASSETTE TAPE	68140-100-105	COMMON	; Use for back tension adjustment of Supply reel	C
4	MASTER PLANE AND REEL DISK HEIGHT JIG	68140-110-101	G-10	; Use for height Adjustment of Reel Disk and Deck plate	D
5	SERVICE JIG KIT	68140-100-301	UPPER DRUM REPLACING JIG	Use for upper drum replacement	E(A)
			DRIVER HANDLE	Use for connection with each driver.	E(B)
			CAP.ADJD RIVER	; Use for CAP nut Adjustment and X-position Adjustment with A/C Head movement.	E(C)
			(+)(-)DRIVER	; Use for screw Adjustment and Audio Azimuth Adjustment.	E(D-G)
			N3 BOX DRIVER	; Use for A/C Head or Roller supply review arm replacement and Tape transport Adjustment.	E(H)
			HEX WRENCH (0.9mm) HEX WRENCH (1.5mm) HEX WRENCH (2.0mm)	; Use for Guide Roller set screw fastening. ; Use for Audio Azimuth Adjustment (Differ from item) ; Use for Drum bush and driver replacement	E(I)
			CERAMIC DIRVER	; Use for Electrical Adjustment.	E(J)
			HOUSING ASSEMBLING JIG	; Use for Housing Assembly.(Refer to service manual for further information)	E(K)
			TRANSPORT MECHANISM ADJUSTING DRIVER	; Use for height adjustment of Guide Roller for Envelope linearity adjustment.	E(L)

A : TORQUE HEAD GAUGE

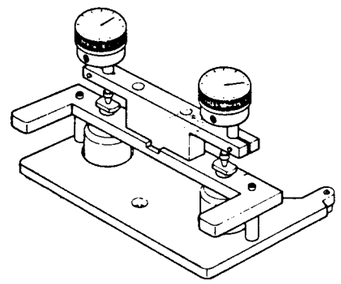


B : ALIGNMENT TAPE

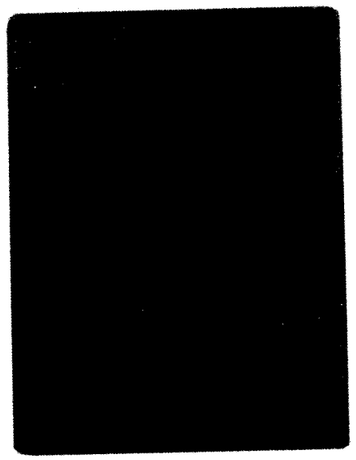


C : BACK TENSION CASSETTE TAPE

D : MASTER PLANE AND REEL DISK HEIGHT JIG



E : SERVICE JIG KIT



(A) UPPER DRUM REPLACING JIG

(B) DRIVER HANDLE

(C) CAP.AD JDRIVER

(D-G) (+)(−) DRIVER

(H) N3 BOX DRIVER}

(I) HEX WRENCH(0.9mm)
HEX WRENCH(1.5mm)
HEX WRENCH(2.0mm)

(J) CERAMIC DRIVER

(K) HOUSING ASSEMBLING JIG

(L) TRANSPORT MECHANISM ADJUSTING DRIVER

3-2. TAPE TRANSPORT SYSTEM ADJUSTMENT FLOW CHART

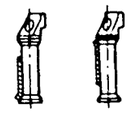
Cylinder assembly replacement
S,T pole base replacement
A/C head assembly replacement
Capstan motor ass'y replacement
Pinch roller ass'y replacement
Cylinder motor replacement
Review arm replacement

S,T guide rollers replacement
Tension level ass'y replacement
FE H'd replacement

Idler clutch assembly replacement
Reel disk replacement
Cam adjustment replacement

1) A/C H'D ass'y adjustment

1. Audio H'D tilt adjustment.
Playback a T-160 tape and adjust lower flange of the review arm for no wrinkle

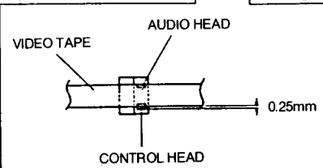


Turn Counter clockwise to correct

Turn clockwise to correct

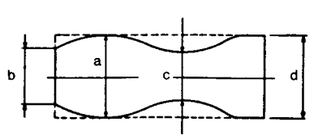
2. Audio azimuth adjustment.
Playback 6KHz audio signal in alignment tape SR 1-2 and adjust for max. output.

3. Audio H'd height adjust- t.
Set the deck to playmode, and adjust head height until power head edge matches to lower tape.
Playback 1KHz audio signal in alignment tape SR2-2 and adjust for max. output.



Adjust head height 0.25mm between lower head gauge and lower tape edge.

4. A/C H'd position adjustment.
Playback SP mode SR1-1 video signal in alignment tape. Set tracking control at it's center. Adjustment taper nut for max. envelope output.



a b c d
c, b, d/a ≧ 0.63

2) Linearity adjustment(S,T guide roller)

1. Maximum envelope output
Playback SP mode white video signal in alignment tape SR1-2. Trigger the scope with switching pulse(A ch). Turn tracking control for maximum envelope output.

2. Entrance side envelope adjustment.
Rotate S-guide roller until entrance side envelope becomes as flat as possible.

3. Exit side envelope adjustment
Rotate T-guide roller until exit side envelope become as flat as possible.

4. Linearity check
Turn tracking control clockwise and counter clockwise. Make sure the envelope increases or decreases keeping flat response.

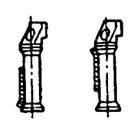
3) A/C assembly fine adjustment

1. Audio azimuth adjustment
Playback SP mode signal in alignment tape SR1-2. Measure 6KHz audio signal output with milivoltmeter. Adjust azimuth adjusting screw and nut for maximum output.

2. A/C H'd position adjustment
Set tracking control to it's center click position. Playback SP mode white video signal in alignment tape SR1-1 and adjust cam adjustment for maximum envelope output. playback alignment tape SR1-2 and make sure envelope is still maximum. If envelope is not maximum, adjust envelope in SP mode again.

4) Review arm adjustment(REV mode)

1. Tape Wrinkle check.
Run T-160 tape in review mode. Make sure tape wrinkle at upper or lower flange of guide tape.



(A) (B)

5) Check transitional operation from Review to Play

Playback programme tape (SP) in Review mode and then change the mode to Play.

Make sure that entrance side envelope changes to envelope for normal Play mode within 3sec.

Steady state is obtained within 3 sec. — YES

NO

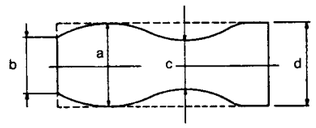
Make sure the gap between lower flange of supply roller and lower tape edge.

Adjust entrance side envelope with S-guide roller.

Run T-160 tape in Review mode and then change the mode to Play mode. If there are the gap or the wrinkle of tape in lower flange of supply roller replace the pole base "L".

6) Envelope check (playing the same VCR used for recording)

Record signals on T-120 and T-160 tapes in SP mode, respectively and playback the signals.



a b c d
c, b, d/a ≧ 0.63

7) Tape wrinkle check

Run T-160 tape in each mode and make sure no wrinkle is caused at each guide.

Play mode	Winkle at guide roller)	→ TO 2)
	Winkle tape at guide flange)	→ TO 1)
	Winkle at supply roller)	→ TO 5)
Play advance mode	Winkle at tape guide flange)	→ TO 2)
Review	Winkle at tape guide flange)	→ TO 4)

Return to the item numbered and perform adjustment again.

NOTE : In the Linearity adjustment in item 2) the adjusted value should be checked both SP tape.

3-3. TAPE TRANSPORT SYSTEM

Note :
The tape transport system has been adjusted precisely in the factory. Alignment is not necessary except for the followings :

*Noises observed on the screen.
*Tape damage.
*Parts replacement in the tape transport system.

3-3-1. Location of tape transport adjustment. (Adjustment reference)

Lower flange height of tape guide is used as the basic reference for the transport adjustment. To keep height of the tape guide, do not apply excessive force onto the main base to prevent deformation.

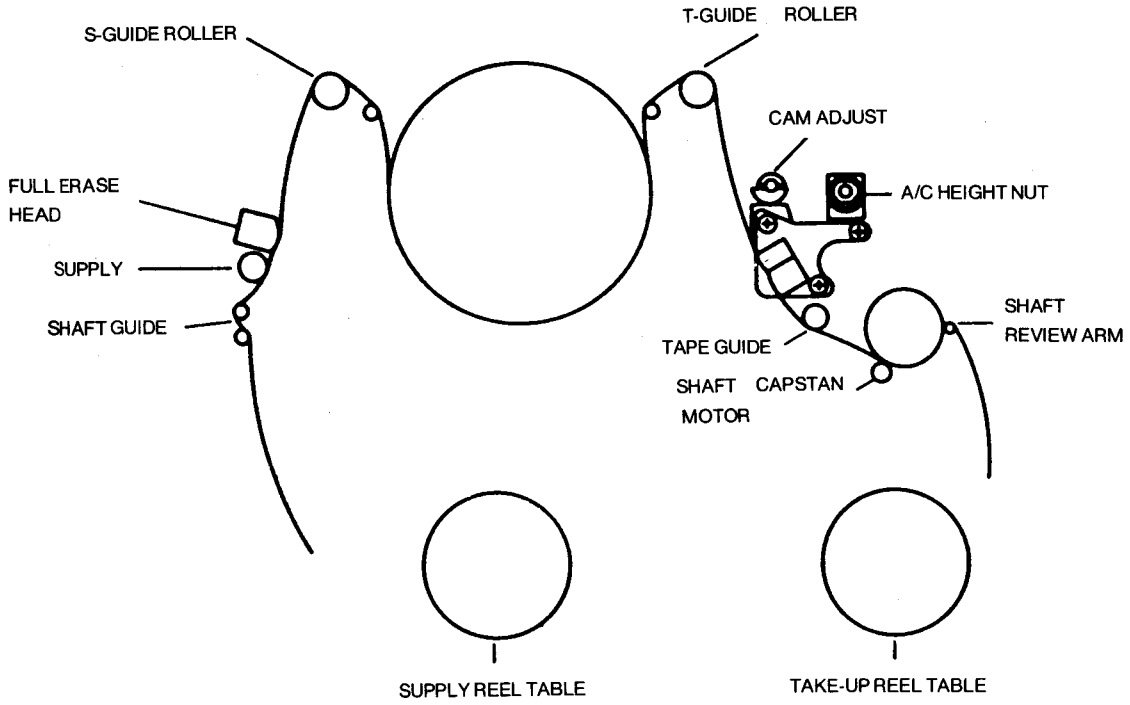


Fig. 1 Location of tape transport adjustment

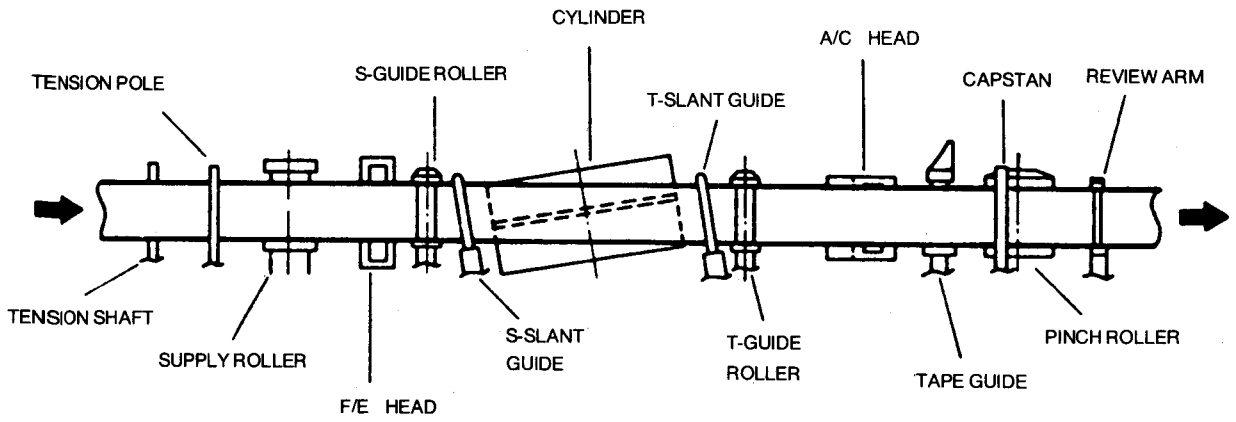


Fig. 2 Tape travel diagram

3-3-2. Tape transport system adjustment

1) Pre-adjustment

When the part (s) are replaced, perform required adjustments by referring to procedures for the tape transport system. When the part (s) are replaced, the tape path may be changed.
First run a T-160 tape and make sure excessive tape wrinkle does not occur at each tape guide.

1. If tape wrinkle is observed at the S, T-guide rollers, turn the S, T-guide rollers until wrinkle disappears.
2. If the tape wrinkle is still observed at the tape guide, perform the tilt adjustment of the A/C head.

2) Adjustment procedures

1. A/C Head Assembly Adjustment

a. A/C tilt adjustment

1. Play back a T-160 tape and observe running condition of the tape at the lower flange of tape guide.
2. Adjust the A/C tilt adjusting screw until tape wrinkle is caused at the lower flange of tape guide as shown in Fig.3(A)
3. Turn the A/C tilt adjusting screw counterclockwise until the tape travels along the lower flange as shown in Fig.3(B)

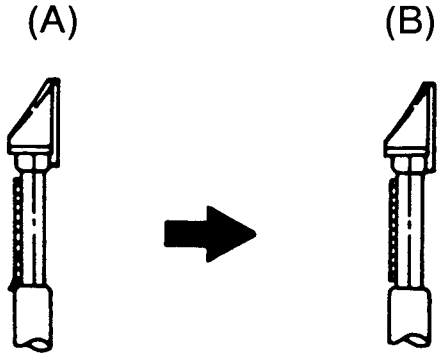


Fig. 3 Tape guide check

b. Audio Azimuth Adjustment

1. Load alignment tape(SR1-2 : 6KHz) and playback the 5KHz signal.
2. Connect channel-1 scope probe to TP501.
3. Adjust screw(B) vertically, to achieve maximum audio leve.
4. Adjust screw(C) and hex nut to achieve maximum audio leve.

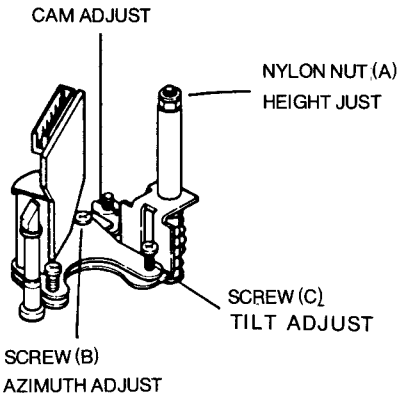


Fig. 4 A/C head assembly

c. Audio head height adjustment

1. Run the alignment tape SR2-2 in the playback mode.
2. Observe surface of the audio head using a dental mirror.
3. Turn the A/C height adjusting nut until the gap of lower tape edge and the lower edge of the control head is about 0.25mm shown in Fig. 5.
4. Play back the 1KHz audio signal in the alignment tape and adjust the head height for maximum audio output.

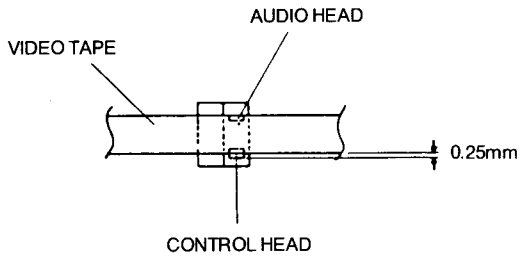


Fig. 5 Head Height

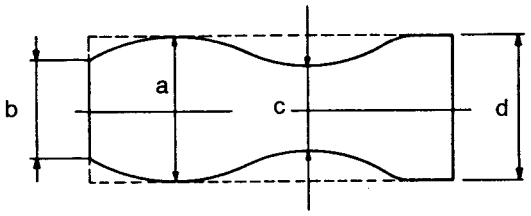
d. A/C Head Position Pre-adjustment

1. Play back the SP mode, video envelope on the SR 1-2 alignment tape.
2. Adjust the CAM adjust for maximum video envelope output make sure the tracking control is set at its center position.

2. Linearity adjustment(S, T-guide rollers adjustment)

1. Play back the mode, video envelope on the SR 1-2 alignment tape.
2. Observe the video envelope signal on an oscilloscope triggered by the video switching pulse.
3. Make sure the video envelope waveform(in its maximum output) meets the specification shown in Fig. 6. If it is not, adjust as follows :

Note:
a=maximum output of the video RF envelope
b=minimum output of the video RF envelope at the entrance side
c=minimun output of the video RF envelope at the center point
d=minimum output of the video RF envelope at the exit side



a b c d
c, b, d/a ≧ 0.63

Fig. 6 Envelope Waveform Adjustment

4. If the section A in Fig. 7 does not meet the specification, adjust the S-guide roller in up or down direction.
5. If the section B in Fig. 7 does not meet the specification, adjust T-guide roller in up or down direction.

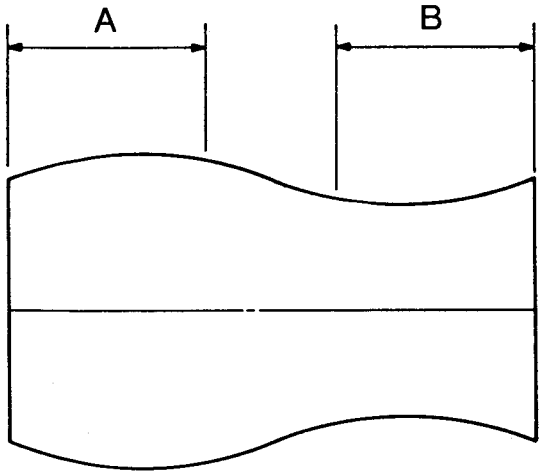


Fig. 7 Adjustment Points

6. After completion of the adjustment (s), increase/decrease tracking control with remocon and make sure video envelope variations are almost flat.
7. If the envelope varies as shown in Fig. 8 adjustment of the S, T-guide rollers may be upset, so perform the adjustment again.

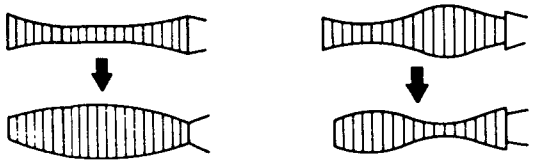


Fig. 8 Abnormal variation of the waveform

3. A/C Head Assembly Fine Adjustment

a. Tape wrinkle check at the lower flange of tape guide.

1. If tape wrinkle is observed at the lower flange of tape guide, adjust the A/C tilt adjusting screw counter clock wise as shown in Fig.3 until the wrinkle disappears.
2. If a gap is observed between the lower flange of tape guide and the lower edge of tape, adjust the A/C tilt adjusting screw clockwise until the tape travels along the lower flange.

Note:
This adjustment should be done using a beginning part of T-160 tape.

b. Azimuth Adjustment

1. Play back the SP mode, 6KHz audio signal on the alignment tape SR1-2.
2. Adjust the A/C azimuth adjusting screw for maximum audio output as shown in Fig.4.

c. Head heigh adjustment

1. Play back the alignment tape(SR 2-2).
2. Adjust the A/C head height adjusting nut for maximum audio output.

d. A/C head position adjustment

1. Play back the mode, white video envelope signal on the alignment tape (SR1-2).
2. Trigger the oscilloscope with the video switching pulse and observe the video envelope waveform.
3. Turn the cam adjust slowly and fix the taper nut at the position where the video envelope reaches a peak level.

3. Review Arm Guide Lever Adjustment

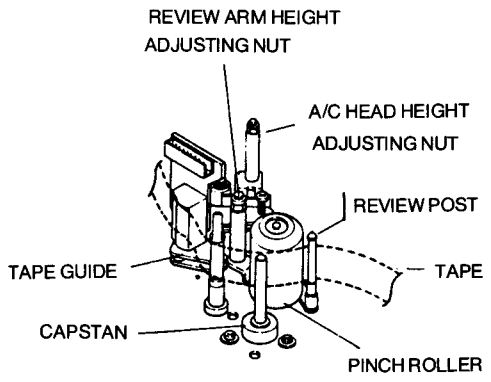


Fig. 9 Review Arm Guide Leve Adjustment

1. Set the MVCR to FPS mode with T-160 tape (at beginning portion) loaded. Switch the FPS mode to review mode, after some tape has been wound into T-reel table.

2. Check tape wrinkle at the upper and lower flange of tape guide. Adjust the review arm so that the tape runs along the lower flange.
3. Set the MVCR to the FPS mode again and make sure the tape is not twisted between the capstan and the review arm guide.
   If it is twisted again, adjust the review arm guide height and the adjustment in step 1.

5. Check For Transitional Operation From Review to Play

Check transition from review mode to play mode, using a pre-recorded tape, make sure the entrance side of envelope comes to an appropriate steady state within 3 seconds, shown in Fig. 10.

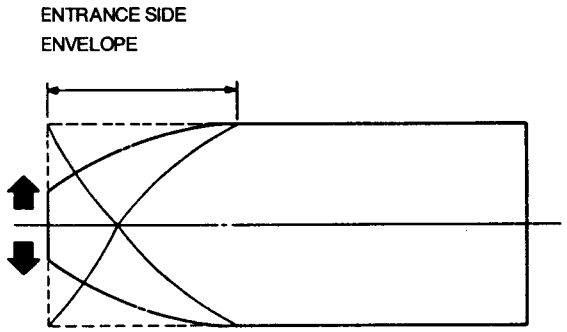


Fig. 10 Video envelope rising when operation mode is switch from review to play mode.

If it does not rise within 3 seconds, adjust as follows:

1. Make sure the tape gap of supply roller lower flange. If there is gap. adjustment is not available.
2. Change operation mode from the review to the play mode again and make sure entrance side of envelope rises within 3 seconds.
3. If there is rising because of defected part, replace base cylinder and base pole and then adjust again.

6. Envelope Check

1. Make recordings on T-120 and T-160 tapes, and make sure the playback output envelope meets the specification shown in Fig.11.
2. In playback mode using the same video deck as used for the recording, (with a T-120) the video envelope should meet the specification shown in Fig. 11. In mode, (A) should be same as (B). If the head gap is wide, upper cylinder should be replaced.

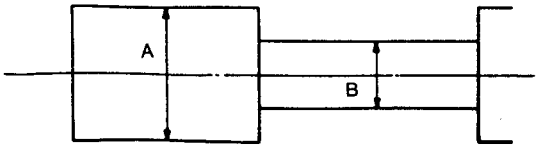


Fig. 11 Envelope output and output level difference

7. Tape Wrinkle Check

1. Run the T-160 tape in the playback, FPS, review and the pause mode and then observe tape wrinkle at each guide.
2. If excessive tape wrinkle is observed at the mode shown below, perform the associated adjustment also shown below.

a. Playback mode

Tape wrinkle at the S, T-guide roller section: Linearity adjustment. (S, T Guide Rollers Adjustment)
Tape wrinkle at tape guide flange: A/C head assembly adjustment.

b. Review mode

Tape wrinkle at tape guide: Review arm guide lever adjustment.

3-4. REEL TORQUE

3-4-1. General Features.

1. The rotation of the capstan motor operates the ass'y clutch through the belt capstan motor which is directly connected to the assembly clutch.
2. Brake operation and shift operation in FF/REW by one slide way.
3. Transportaion of accurate driving force by gear type (clutch ass'y)
4. Auto Torque is converted by CAM system automatically.

MODE	TORQUE g/cm	GAUGE
PB/REC	60-130	Cassette Torquement
RPS	140-200	Cassette Torquement
FF/REW	ABOVE 1000g/cm	Torque Gauge

Note:
If the Spec is out of above, replace the clutch ass'y and check it.

3-4-2 Location of Tension Pole and Back Tension Adjustment

1. Remove the housing ass'y and set the deck to play mode.
2. Adjust the cam tension to set at 0.5 +/-0.2 from the center of supply roller.
3. The back tension meter should be used for adjustment of back tension.

Check back tension, should be 42 +/-10g.cm.
If not, check while adjusting cam tension.

Counter-Clock wise : Torque UP
Clock wise : Torque DOWN

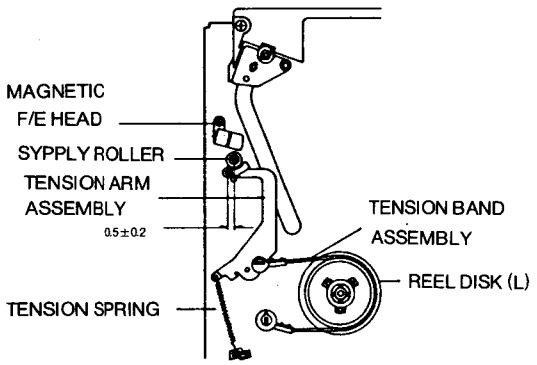


Fig. 12 Tension Pole and Back Tension Adjustment

3-4-3. Reel Torque Adjustment

1. Reel torque adjustment

a. Review mode

Excessive torque may damage the tape, however poor torque may not wind the tape.

b. REC/PLAY BACK (Take-Up) Mode

Weak torque can not wind the tape to the end, however excessive torque may make the tape expand.

BACK TENSION METER

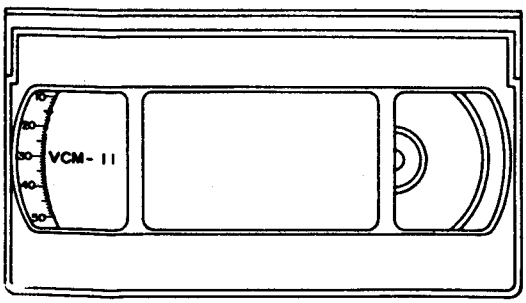


Fig. 13 Back Tension Tape Torque Cassette

c. Inspection

Rewind the torque cassette which is recorded in SP mode to the end and measure the torque shown below.
Rewind Torque : 140-200g.cm
Record/Play Back Torque : 60-130g.cm

2. Reel Torque Check

a. First, record a TV broadcast program on the entire torque cassette tape (KT-300NR) in the SP mode.
b. Load the torque cassette in the MVCR and fast forward the tape before proceeding with measurement.
c. Set the MVCR to the REVIEW mode and feel the tape for about 15 sec., and then make sure the take-up torque of 140-190g.cm is obtained while observing the left torque meter.
d. After completion of step 3, set the MVCR to the PLAY mode and feed the tape for about 30 sec. Read the right torque meter and check whether the torque of 60-130g.cm is obtained.
e. When the review torque and playback torque are out of limit, replace the clutch assembly.
f. When the clutch assembly is replaced, perform the reel torque check.

3. Precautions for Usage of Torque Cassette (KT-300NR)

a. Before loading a torque cassette in a MVCR, always remove tape slack. The tape slack can be removed by rotating the reel to its take-up direction. (The tape tends to slack when there is no reel brake actions).
b. When the torque cassette is loaded, confirm followings :
b-1. Make sure the tape does not ride up or over the tape guide cap. If it does, do not eject the tape but bring the tape to its correct position, taking care not to damage the tape.
b-2. Make sure the tape has no slack, if it has slack, operate the MVCR in FF or REW mode and then stop the tape. Then make sure the tape has no slack.
b-3. After above confirmation, proceed to the reel torque adjustments and confirmation.
c. Cautions for removal of torque cassette.
c-1. When removing the torque cassette from the MVCR, set the MVCR to the STOP mode and wait for several seconds. Then, make sure the tape has no slack. Push the EJECT button to remove the cassette.
c-2. When removing the torque cassette from the MVCR, also make sure the tape has no slack inside the cassette lid before pulling the cassette from the MVCR. If the tape has no slack inside the lid, carefully bring the tape in place and then pull the cassette.
d. If the previous precautions 1,2 and 3 are not performed properly, the tape may be damaged and correct measurements can not be performed.
e. Do not use worn out or damaged tape, if they are used they may damage video heads on the cylinder. In such a case, always replace the tape with a new one.

4. Reel Disk Height Adjustment

1. Set the jig for reel disk height to the reel disk L,R as shown in Fig.14
2. The needles of L,R should be located within +/-0.05 limits.

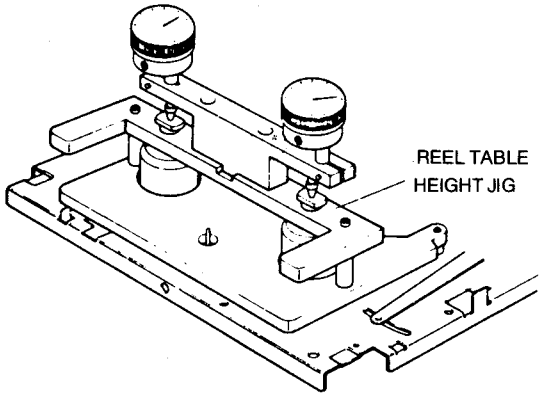


Fig. 14 Reel disk height

4. ELECTRICAL ADJUSTMENTS

4-1. PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustment only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

4-1-1. Required test equipment

1. Color television or monitor
2. Oscilloscope : wide-band, dual-trace, triggered delayed sweep.
3. Frequency counter.
4. Audio oscillator.
5. Audio voltmeter.
6. Digital voltmeter.
7. Signal generator : RF/IF sweep/marker.
8. Signal generator : PAL color bar. 100% White.
9. Recording tape.
10. Alignment tapes : SR2-2, SR1-2.

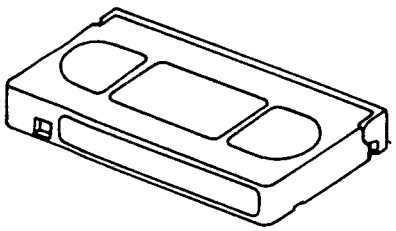


Fig. 1 Tape

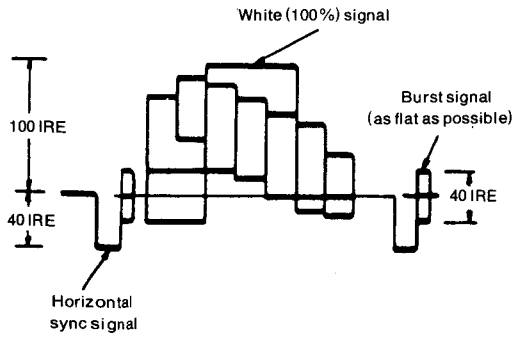


Fig. 2 Color bar signal of pattern generator

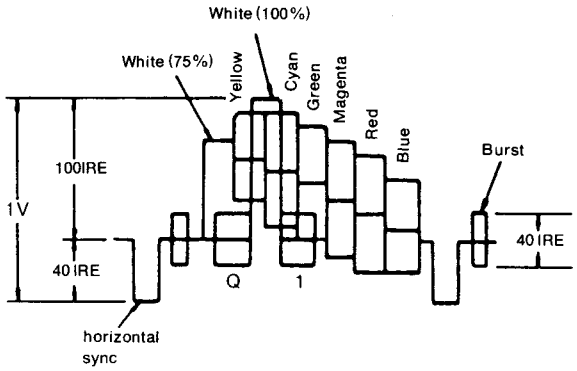


Fig. 3 Color bar signal waveform

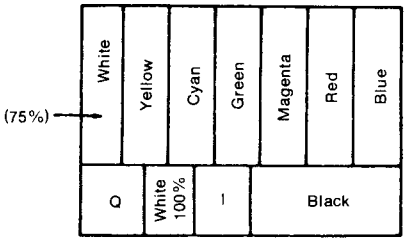


Fig. 4 Color bar pattern

4-1-2. Alignment tape contents

Tape	Vdieo signal	Audio signal	Applications
SR2-2 (SP)	Color bars	1KHz	* Video signal playback circuit checks and adjustments. * Audio signal playback circuit checks and adjustments.
SR1-2 (SP)	Monoscopes	6KHz	* Interchangeability checks and adjustments * SERVO circuit check and adjustments * Audio head Azimuth adjustments

4-1-3. Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor capacitor, etc.) to be adjusted in this step.
Signal	Input signal required to perform adjustment.
Mode	Equipment operating mode at time of check of adjustment.
100% White	100% White signal as video input.
Color bar	Color bar signal as video input
1KHz	Supply a 1KHz sinewave as audio input signal.
STOP	Power on and machine in stop mode.
REC	Recording mode.
PB	Playback mode.
SR2-2	Playback SR2-2 alignment tape
SR1-2	Playback SR1-2 alignment tape
STILL	Playback then pause
Description and Waveform	This column provides an explanation of the step, notes, adjustment values and waveform diagrams.
MAIN	Main PCB (VIDEO, TUNER, SERVO, AUDIO)
P.A	PRE-AMP PCB
TIMER	Timer PCB (SYSTEM CONTROL, TIMER)
SUB	VPS (OPTION) SYNC DET. VOLUM CONTROL

4-2 SERVO SECTION in Main. PCB

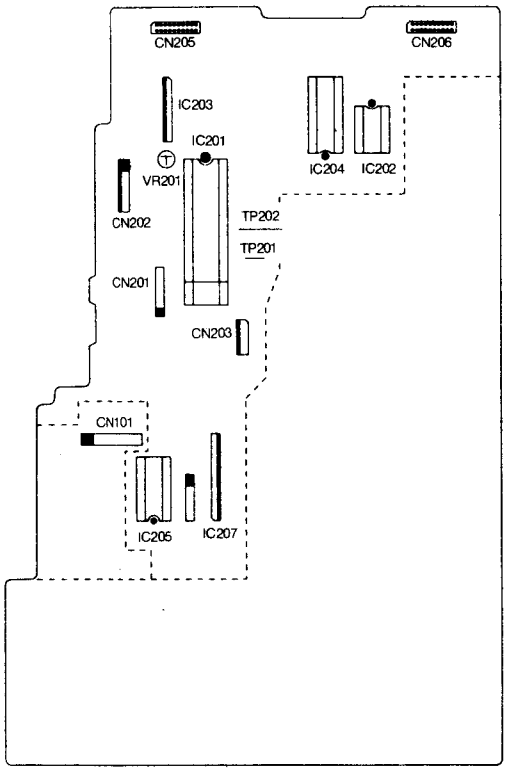


Fig. 5 Servo Section in Main Component Side

4-2-1. Switching Point Adjustment

Equipment : Oscilloscope
Test Points : TP3202 (Video Output Signal)
TP221 (H'd SW 25Hz)
Adjust : VR201

The pulse generator (PG) shifter determines the video head switching point during playback. Misadjustment of the PG shifter may cause head switching noise and/or vertical jitter in the picture.

1. Load the instrument with an alignment tape and playback the color bar signal of monoscope signal. (Alignment tape SR2−2)
2. Connect channel 1-1 scope prove(1V/div. 50us/div.) to TP201. Trigger the scope on channel 1-1.
3. Connect channel 1-2 scope probe(1V/div.)to TP3203.
4. Set the scope to (+) slope and adjust the (VR201) so that the trailing edge of the SW 25Hz pulse is placed 6.5H +/−0.5H(horizontal) lines before the start of vertical sync pulse in Fig.6

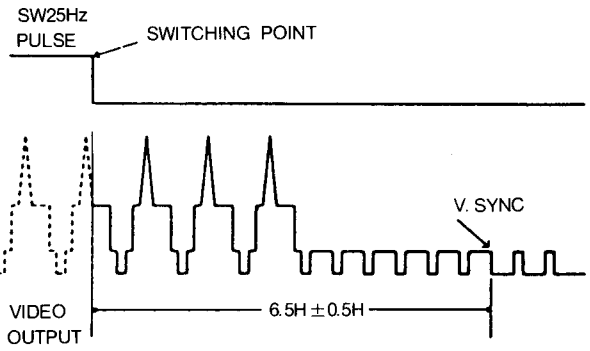


Fig.6 Head Switching Point Adjustment

4-3. LUMA/CHROMA SECTION in Main. PCB

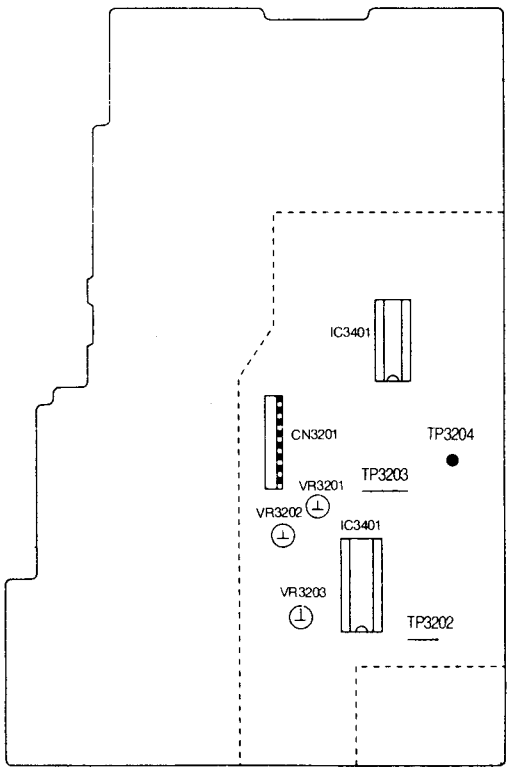


Fig.7 LUMA/CHROMA Section in Main Component Side

4-3-1. CCD IN (CLAMP) Level Adjustment

Equipment : Oscilloscope
Test Point : IC3201 Pin 10 (CCD Video Level)
Adjust : VR3203(CCD Level Control)

This adjustment is for the compensation of the Drop out.
When there is the Drop out, the CCD output level is very low and black trigger occurs. If the level is very high, white trigger occurs.

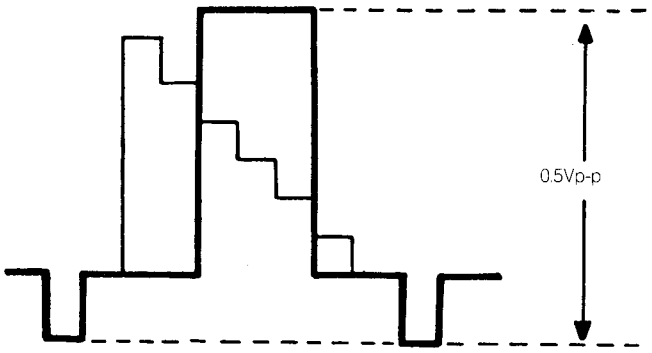


Fig.8 CCD IN Level Adjustment

1. Connect channe1-1 scope probe(0.1V/div) to IC3201 Pin 10.
2. Load the instrument with an alignment tape and play back the color bar signal.(Alignment Tape SR2-2)
3. Adjust the CCD Level Control(VR3203) for 0.5V p-p.

4-3-2. E−E VIDEO Level Adiustment

Equipment : osoilloscope
Test Piont : TP3203 (Video output signal)
Adijust : VR3205

1. Apply a PAL colour bar signal to the video input terminal of the TV channel signal generator(Fig 17)
2. Set channel selector to 02
3. Apply the output of the generator to the RF IN terminal on the rear panel, Using the attenuator, adjust the point signal level for 70 dBμ measured at the RF IN terminator.
4. Connect channel 1-1 scope probe(0.5V/div) to TP3203
5. Adjust E−E Level control (VR3205) for 2.2Vp-p

4-3-3 FM Carrier & Deviation Adjustment

Equipment : Tracking scope
Test Point : TP3204
Adjust : VR3201(Deriation)
VR3202(FM carrier)

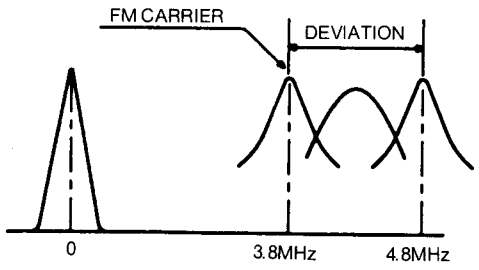


Fig.9 FM Carrier & Deviation Adjustment

This adjustment sets the frequency of the FM Carrier and Deviation. If deviation is less than 1MHz, the video output level becomes low. When the deviation is more than 1MHz, the output level becomes high and there will be the overmodulation. So the screen has the white/dark trigger and the S/N ratio is not good.

1. Apply 100% white signal to the video input jack on the rear panel.
2. Rotate the input selected S/W to AUX.
3. Connect tracking scope to **CN3102 pin 1**
4. Load blank tape and make a recording.
5. Adjust the FM carrier control (VR3202) so that the frequency is 3.8MHz +/−0.1 MHz.
6. Adjust the deviation control (VR3201) so that the frequency is 4.8MHz +/−0.1MHz for the 1MHz deviation (See Fig.9)

deviation (See Fig.9)

4-3-4. PB VIDEO Level Adjustment

1. Equipment : Oscilloscope
2. Test Point : TP3203(Video output signal)
Adjust : VR3204
3. Adjust PB Level control (VR3204) for 2.2Vp-p

4-4 TUNER/DEMODULATOR SECTION in Main. PCB

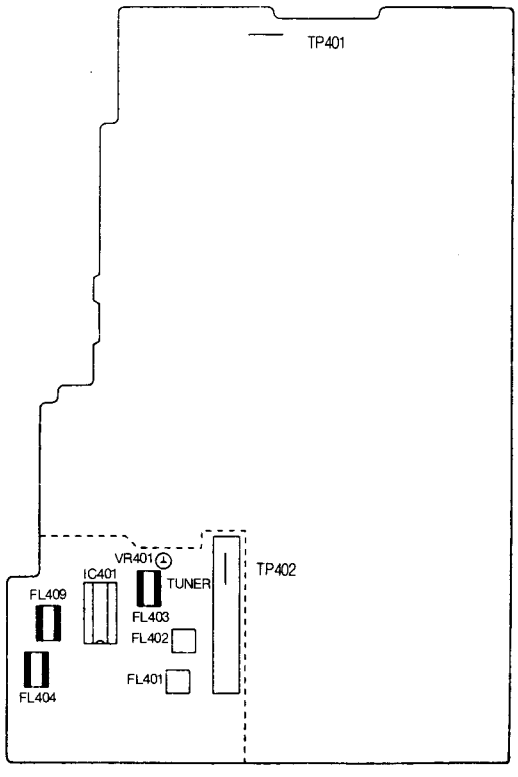


Fig.10 Tuner/Demodulator Section in Main. PCB Component Side.

4-4-1. TRAP Adjustment (OPTION)

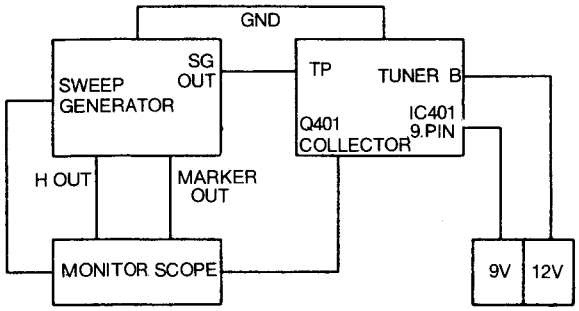


Fig. 11 Composition for TRAP Adjustment

Equipment : Sweep Generator
Test Point : Q401 Collector (IF OUT)
Adjust : FL401, FL402 (TRAP)

1. Place the instrument in E-E mode.
2. Remove connector CN101 and connect DC bias supply of 12V to the pin B + Tuner on the Main PCB.
3. Connect the sweep generator output to tuner TP within the tuner unit. (Fig.11)
4. Connect a jig input to the collector of Q401.
5. Adjust the trap (FL401, 402) in the tuner unit shown in Fig.12.

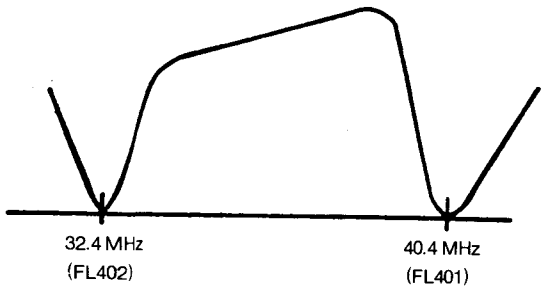


Fig.12 TRAP Adjustment

4-4-2. VIF Adjustment

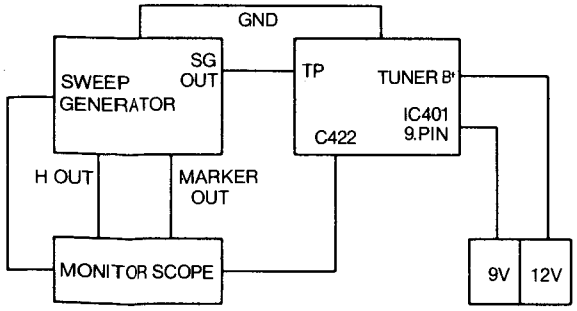


Fig.13 Composition for VIF Adjustmnet

Equipment : Sweep Generator, Monitorscope
Test Point : C422(Video output)
Adjust : FL 404(VIF-DET TANK)

This adjustment makes the sync detecting reference signal tuning circuit of the picture-IF circuit resonates with 38.9MHz

1. Place the instrument in the E-E mode.
2. Remove connector CN101 and connect DC bias supply of 9V, 12V to the pin B +, pin 9 of IC401 on the Main PCB.
3. Connect sweep gernerator output to tuner TP within the tuner unit. (Fig. 13)
4. Connect monitor scope input to C422.
5. Connect 100 damping resistor between the Pin 12 and pin 13 of IC 401.
6. Adjust the core (FL403) in the tuner section shown in Fig.14
7. Remove 100 damping resistor.
8. Adjust the VIF control (FL404) for maximum.(Fig. 15)

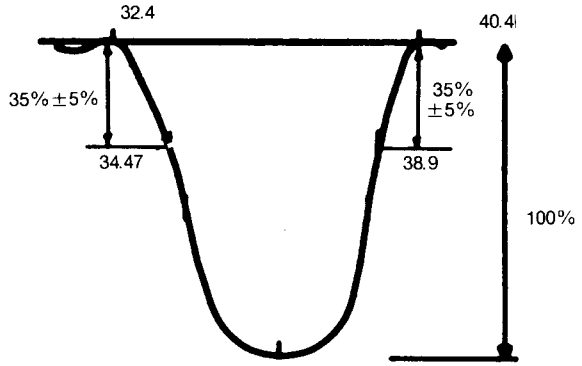


Fig.14 Illustration for balance between 38.9 MHz and color signal

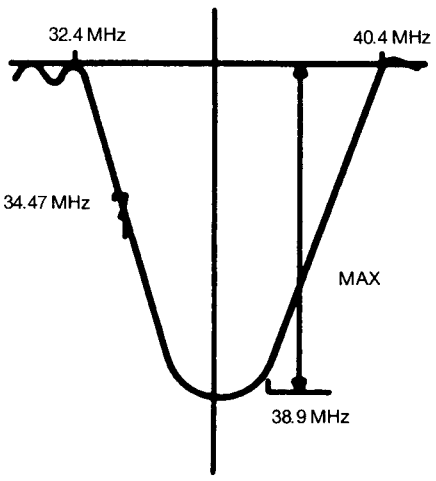


Fig.15 VIF 38.9 MHz Maximum Detection

4-4-3. AFT Adjustment

Equipment : Sweep Generator, Monitorscope
Test Point : TP401 (AFT Output)
Adjust : FL409

1. After adjustment of VIF, connect monitorscope input to TP401.
2. Adjust the AFT (FL409) in the tuner unit shown in Fig.16.

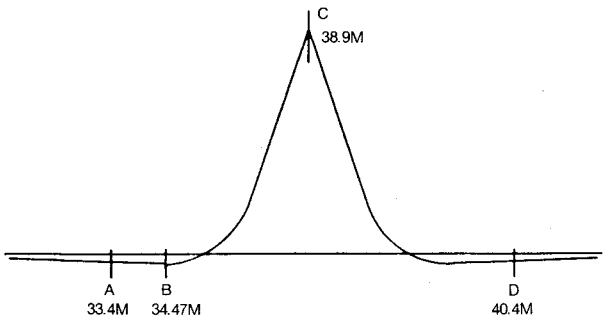


Fig.16 AFT Adjustment

4-4-4. RF AGC Adjustment

Equipment : TV Channel Signal Generator
Oscilloscope or DC Voltmeter
Test Point : TP402(Tuner RF AGC Input)
Adjust : VR401 (RF AGC Control)

This adjustment determines the point where the AGC is activated.

1. Apply a PAL colour bar signal to the video input terminal of the TV channel signal generator. (Fig. 17)
2. Set channel selector to 02
3. Apply the output of the generator to the RF IN terminal on the rear panel. Using the attenuator, adjust the point signal level for 70dBu measured at the RF IN Terminator. (Fig.17)
4. Conect channel-1 scope probe (1V/div) to TP402.
5. Turn the VCR power on and select TV mode with INPUT SEL, Key on the front pannel.
6. Set the channel on the front panel to CH2.
7. Adjust the RF AGC control (VR401) for 4.2V +/− 0.1V.
8. After adjusting the point level of the RF IN terminal for 60dBu, check the condition of screen. If there are some noise, adjust VR401 so that the noise disappear.
9. After adjusting the input level of the RF IN terminal for 100dBu, then check the condition of screen. If there are some saturations (unstable picture of colour, etc), adjust VR401 again so that the saturation phenominon disappear.

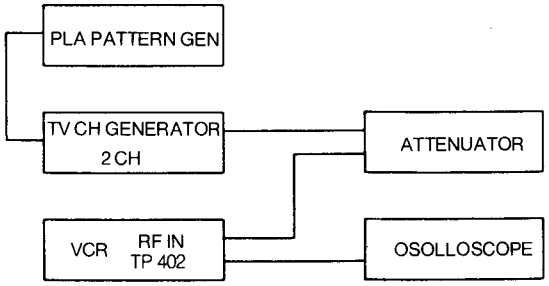


Fig.17 RF AGC Adjustment

4-5. AUDIO SECTION in Main. PCB

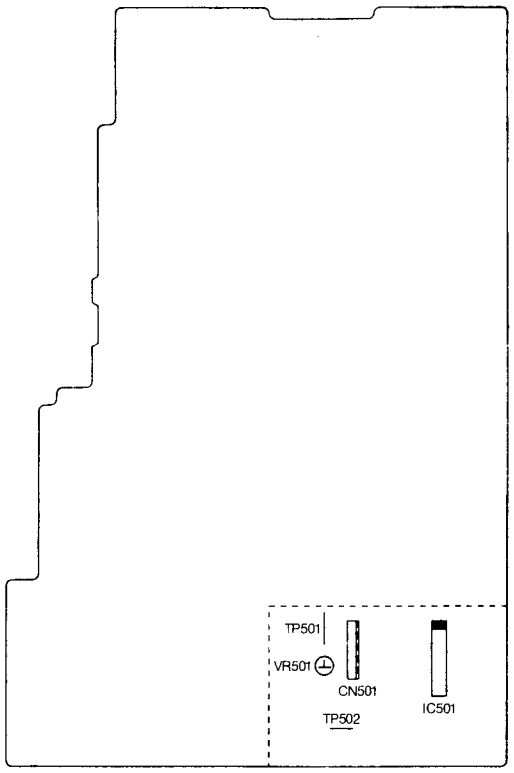


Fig.18 Audio Section in Main Component Side

4-5-1. Audio Bias Level Adjustment

Equipment : AC Millivoltmeter SP
Test Point : TP1, TP2 (in A/C Head)
Adjust : VR501 (REC Bias Level ADJ)

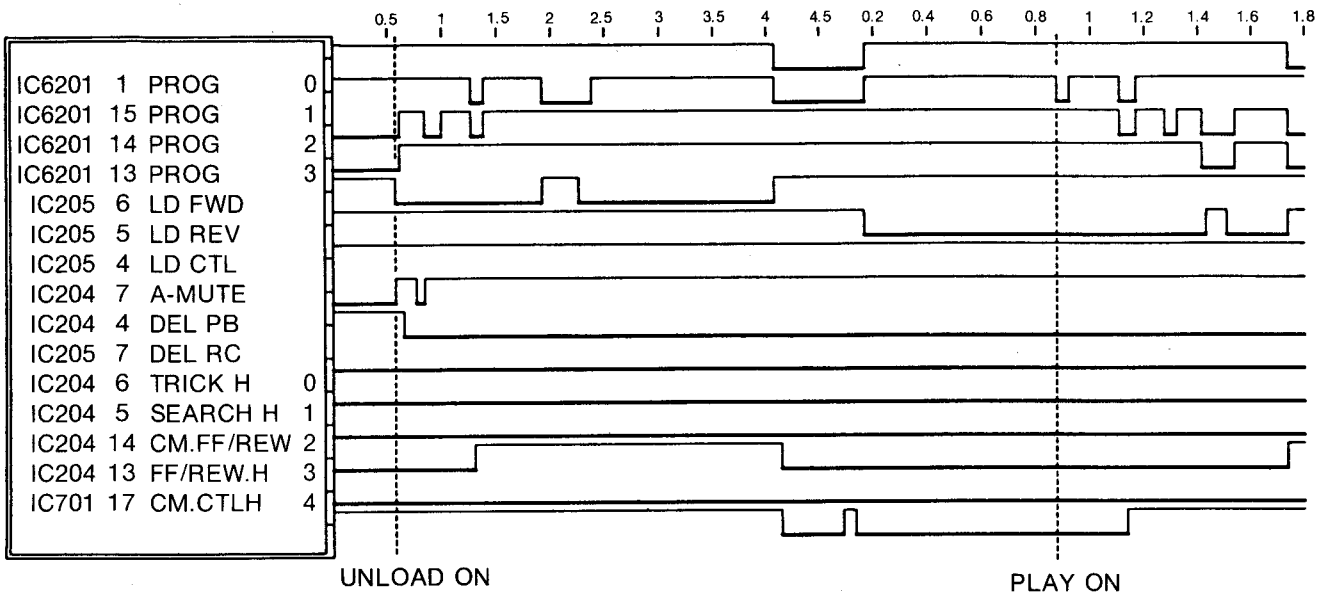
When the audio record bias is too low, high frequencies are increased resulting in distortion.
When the level is too high, high frequencies are attenuated.

1. Load blank tape and place in the record mode with no signal.
2. Connect the A/C Voltmeter to TP1, TP2 in A/C head.
3. Adjust the audio bias level control (VR501) for 2.4mVrms.

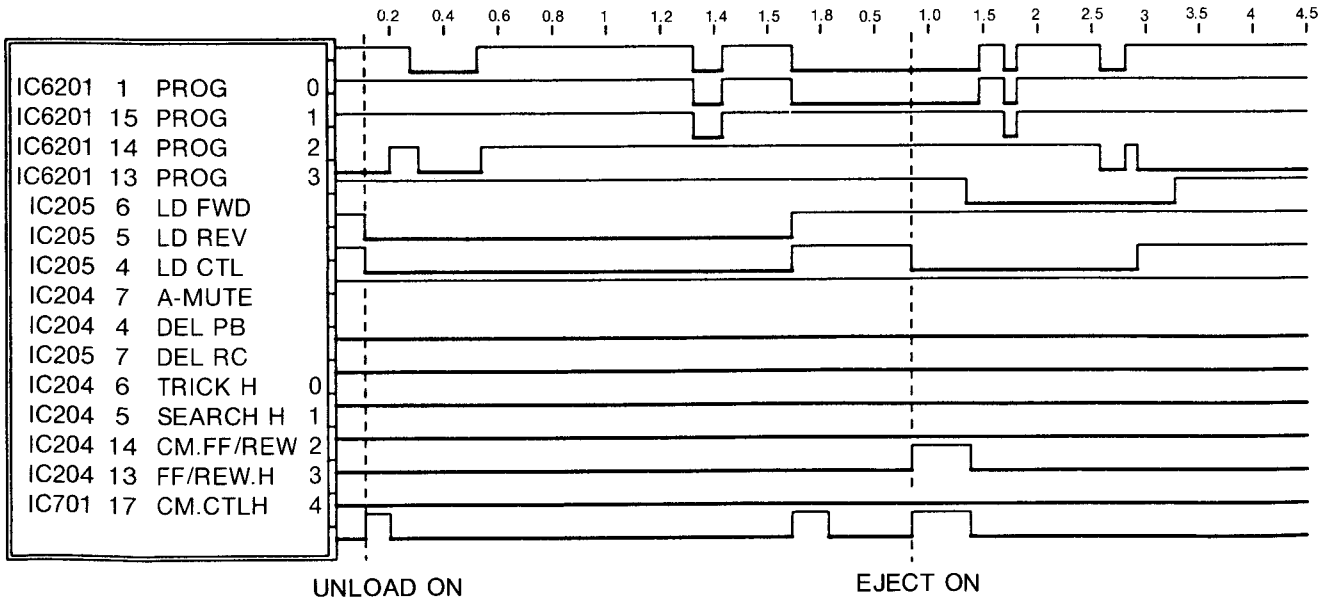
5. TIMING CHART/TROUBLESHOOTING GUIDE

5-1 TIMING CHART

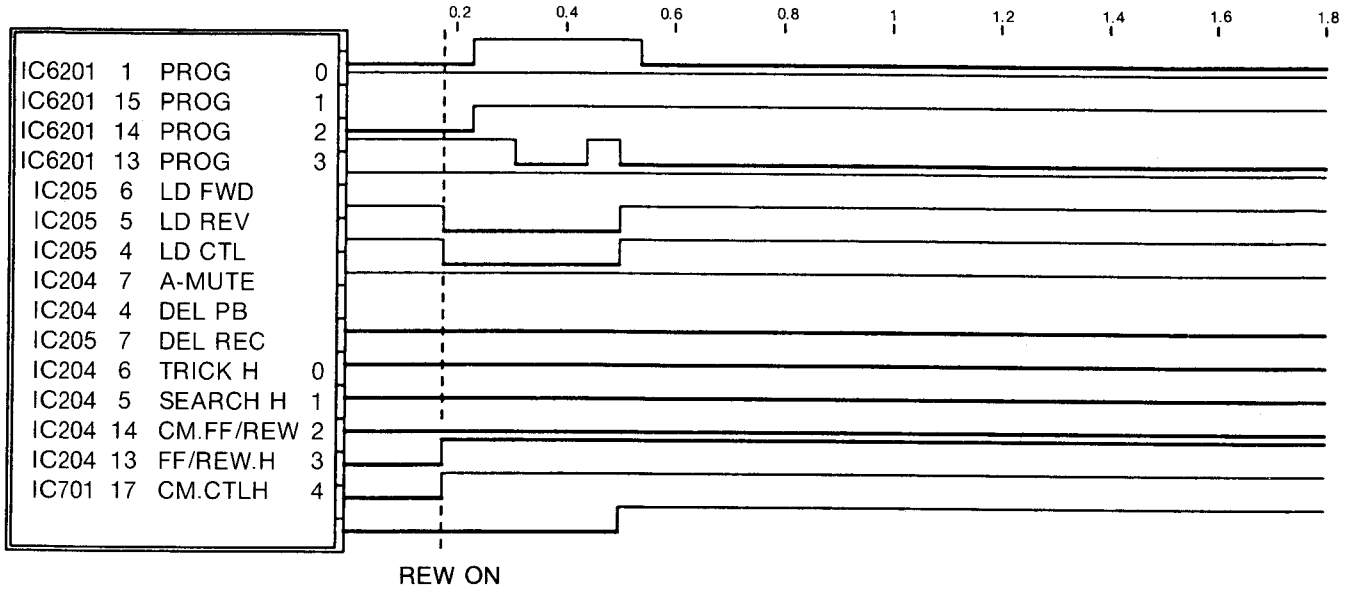
5-1-1. PLAY/UNLOAD/PLAY


0.5 1 1.5 2 2.5 3 3.5 4 4.5 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8
IC6201 1 PROG 0
IC6201 15 PROG 1
IC6201 14 PROG 2
IC6201 13 PROG 3
IC205 6 LD FWD
IC205 5 LD REV
IC205 4 LD CTL
IC204 7 A-MUTE
IC204 4 DEL PB
IC205 7 DEL RC
IC204 6 TRICK H 0
IC204 5 SEARCH H 1
IC204 14 CM.FF/REW 2
IC204 13 FF/REW.H 3
IC701 17 CM.CTLH 4
UNLOAD ON
PLAY ON

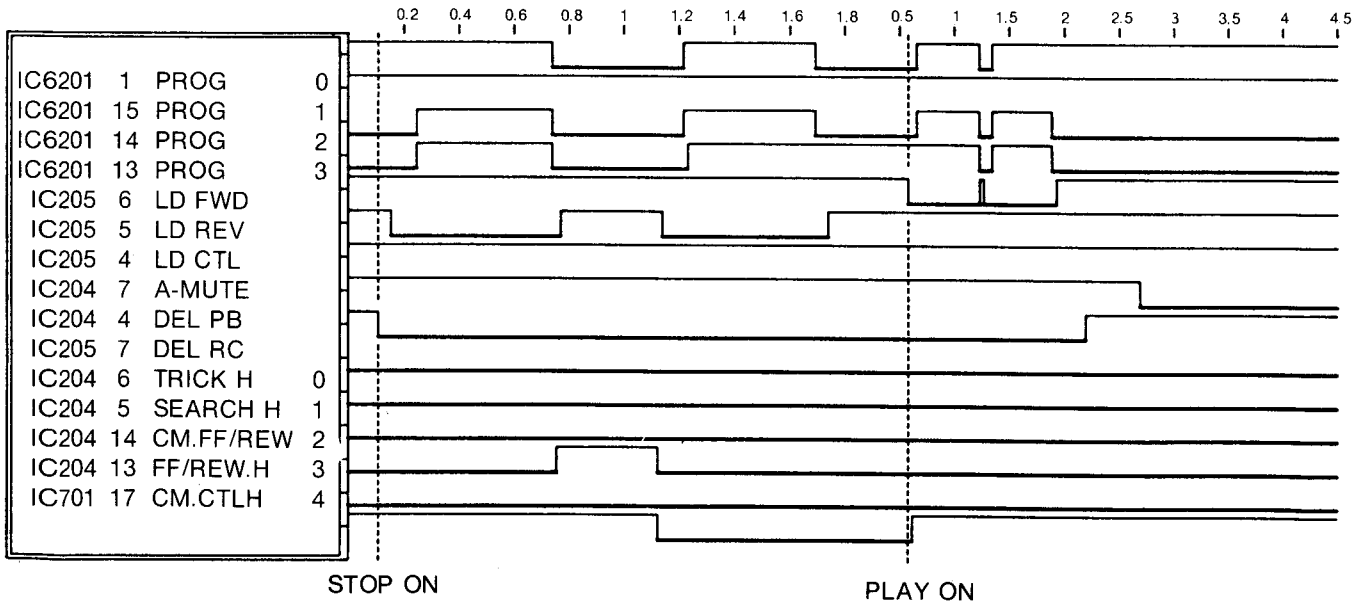
5-1-2. EJECT/UNLOAD/EJECT


0.2 0.4 0.6 0.8 1 1.2 1.4 1.5 1.8 0.5 1.0 1.5 2 2.5 3 3.5 4 4.5
IC6201 1 PROG 0
IC6201 15 PROG 1
IC6201 14 PROG 2
IC6201 13 PROG 3
IC205 6 LD FWD
IC205 5 LD REV
IC205 4 LD CTL
IC204 7 A-MUTE
IC204 4 DEL PB
IC205 7 DEL RC
IC204 6 TRICK H 0
IC204 5 SEARCH H 1
IC204 14 CM.FF/REW 2
IC204 13 FF/REW.H 3
IC701 17 CM.CTLH 4
UNLOAD ON
EJECT ON

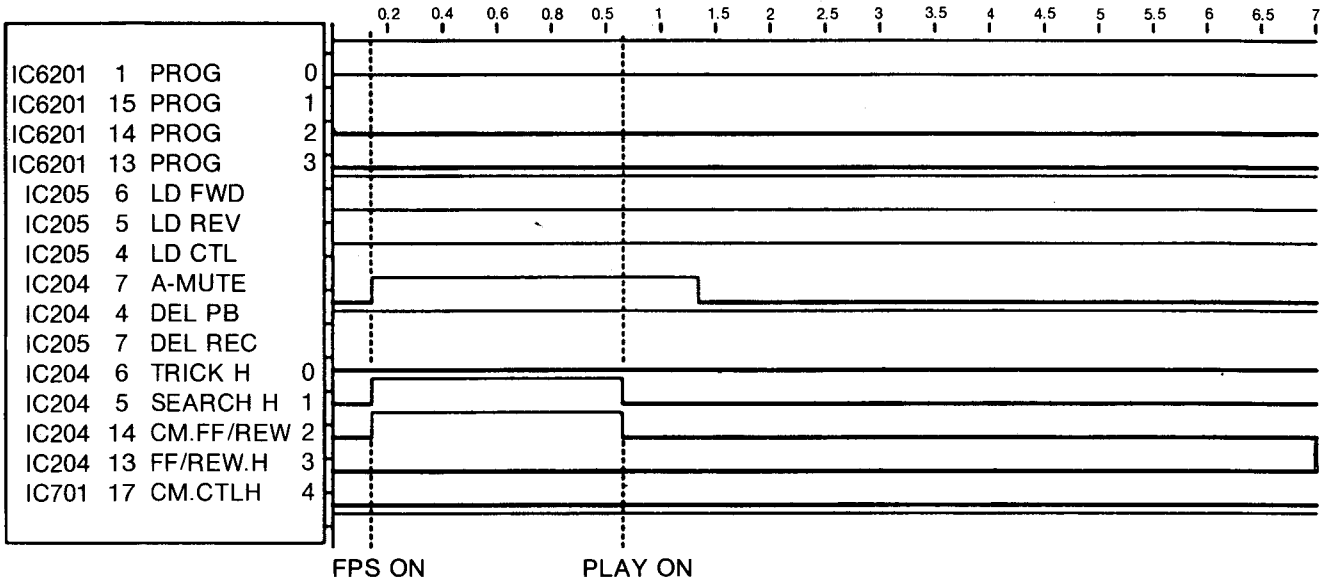
5-1-3. STOP/REW



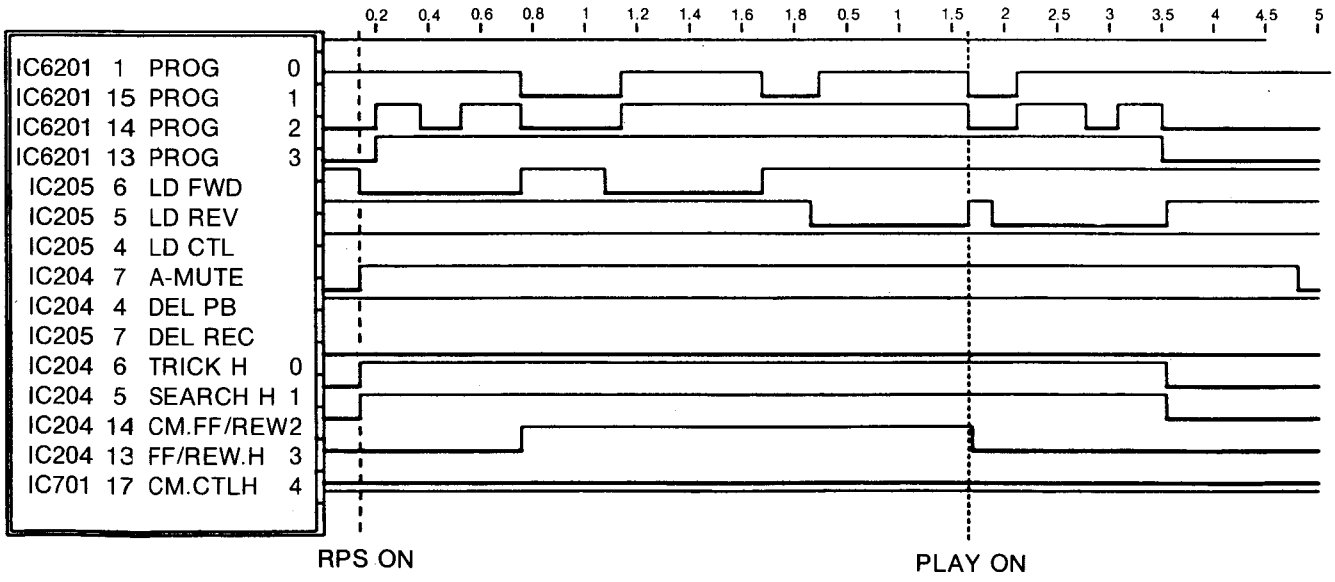
5-1-4. PLAY/STOP/PLAY



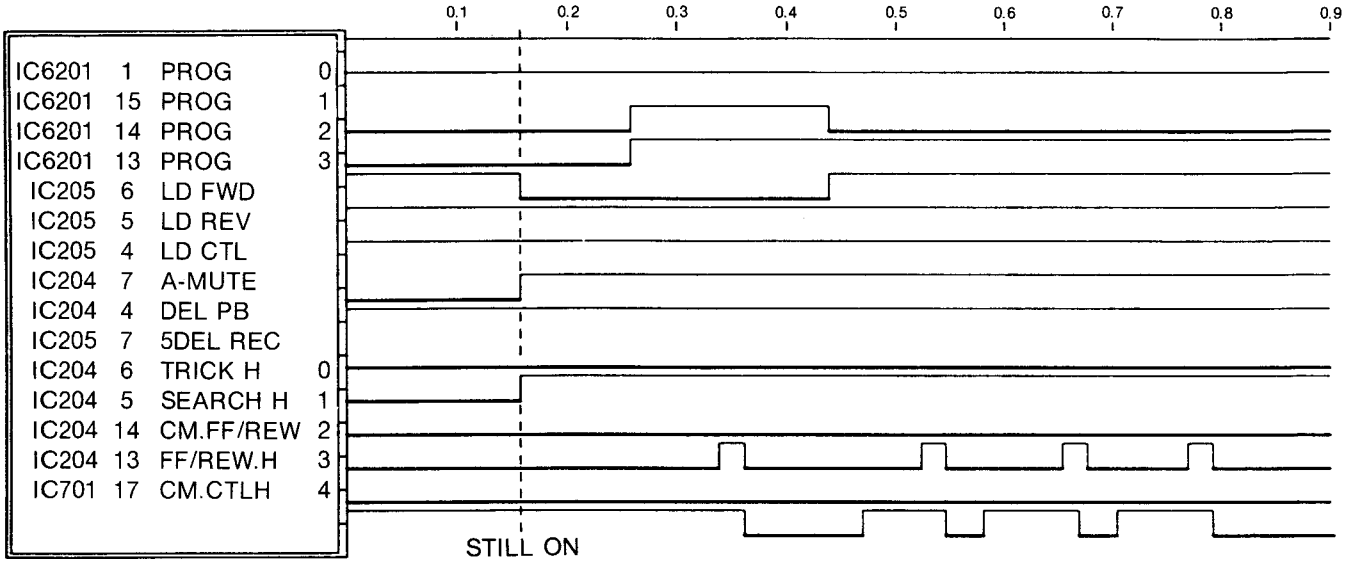
5-1-5. PLAY/FPS/PLAY


0.2 0.4 0.6 0.8 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7
IC6201 1 PROG 0
IC6201 15 PROG 1
IC6201 14 PROG 2
IC6201 13 PROG 3
IC205 6 LD FWD
IC205 5 LD REV
IC205 4 LD CTL
IC204 7 A-MUTE
IC204 4 DEL PB
IC205 7 DEL REC
IC204 6 TRICK H 0
IC204 5 SEARCH H 1
IC204 14 CM.FF/REW 2
IC204 13 FF/REW.H 3
IC701 17 CM.CTLH 4
FPS ON
PLAY ON

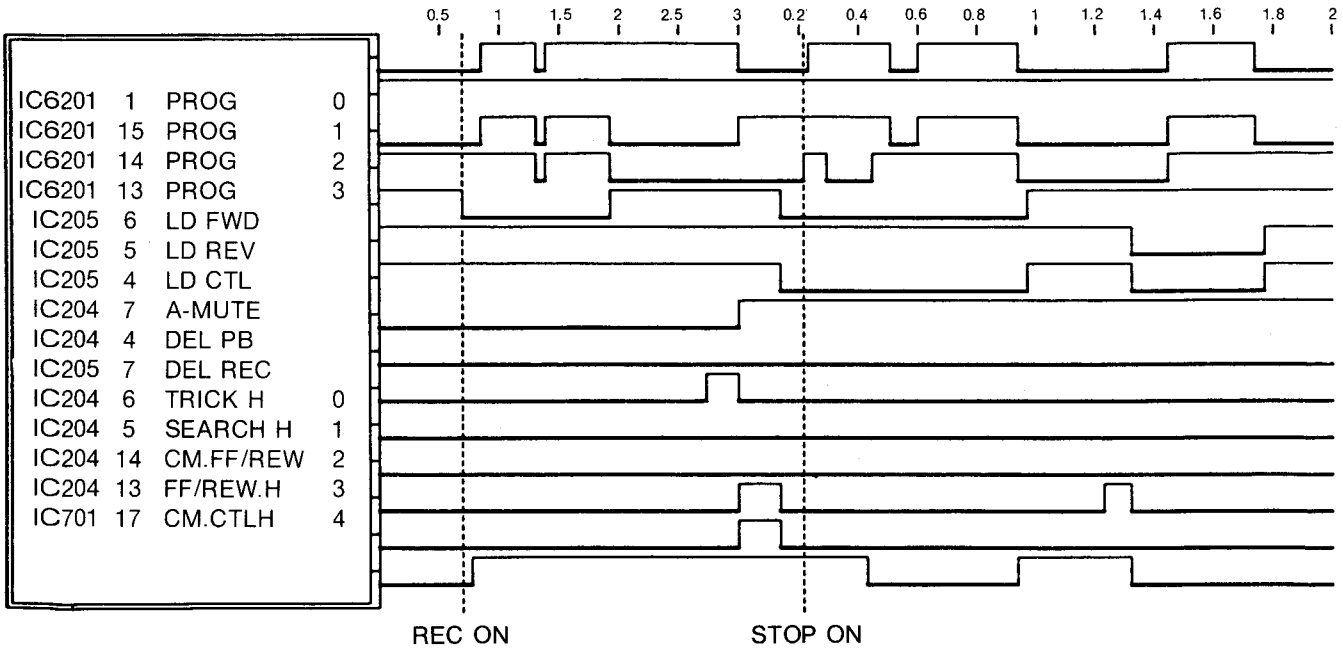
5-1-6. PLAY/RPS/PLAY


0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5
IC6201 1 PROG 0
IC6201 15 PROG 1
IC6201 14 PROG 2
IC6201 13 PROG 3
IC205 6 LD FWD
IC205 5 LD REV
IC205 4 LD CTL
IC204 7 A-MUTE
IC204 4 DEL PB
IC205 7 DEL REC
IC204 6 TRICK H 0
IC204 5 SEARCH H 1
IC204 14 CM.FF/REW2
IC204 13 FF/REW.H 3
IC701 17 CM.CTLH 4
RPS ON
PLAY ON

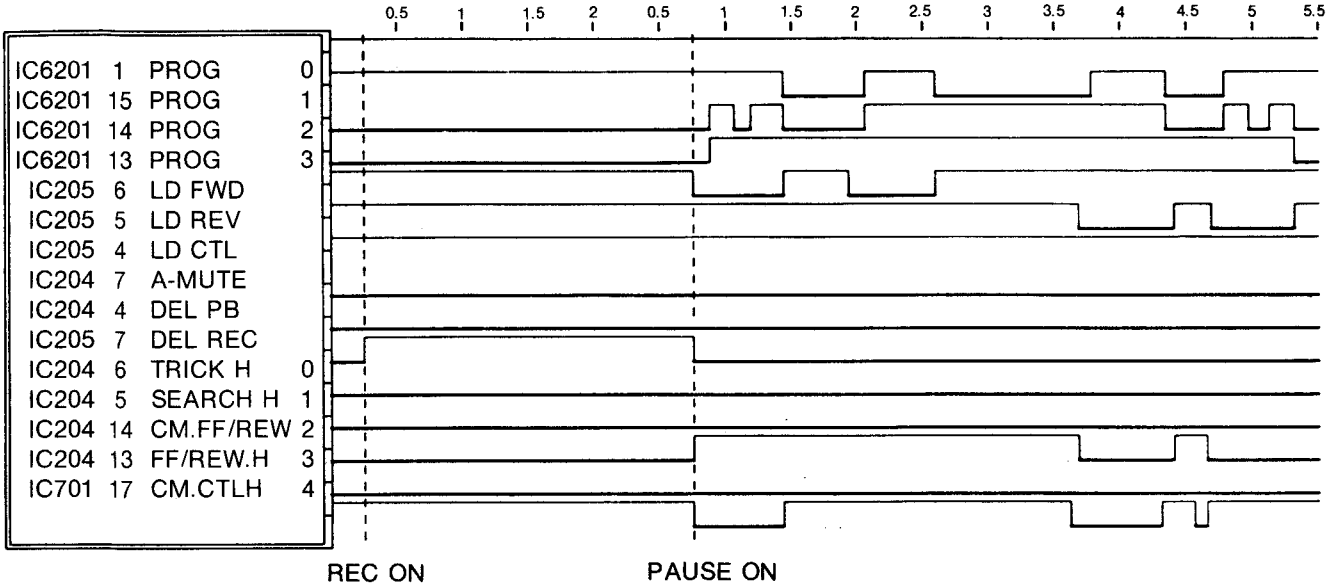
5-1-7. PLAY/STILL



5-1-8. STOP/REC/STOP

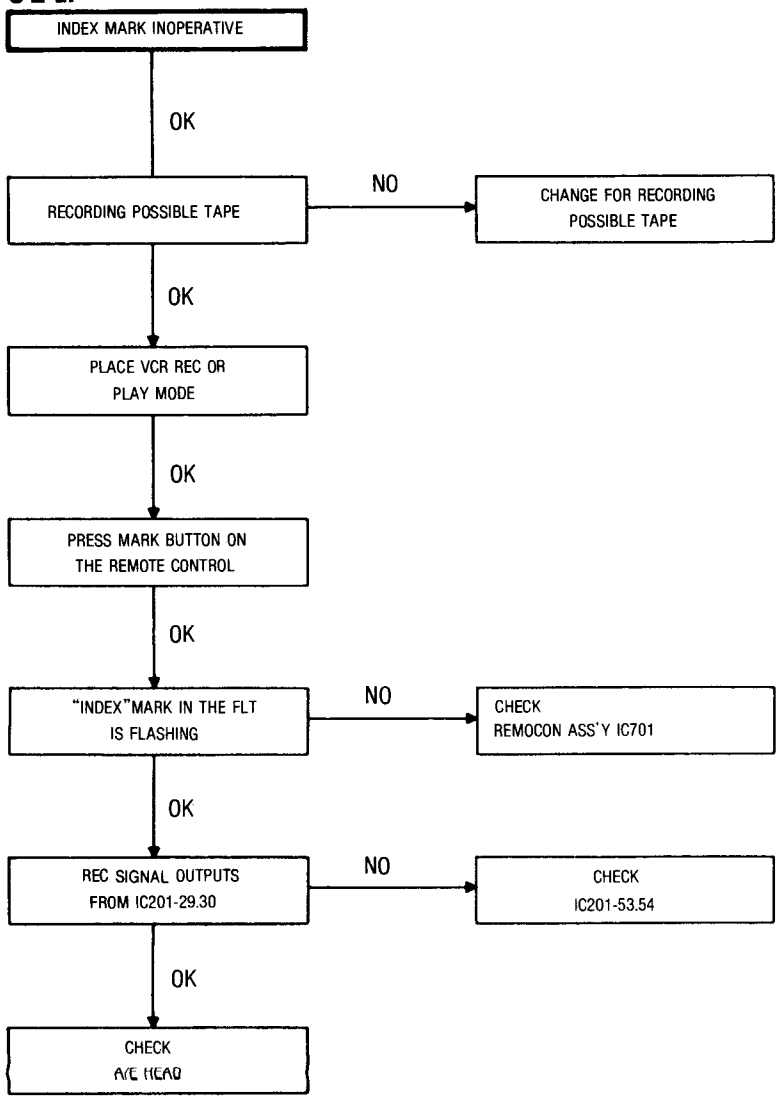


5-1-9. PAUSE/REC/PAUSE

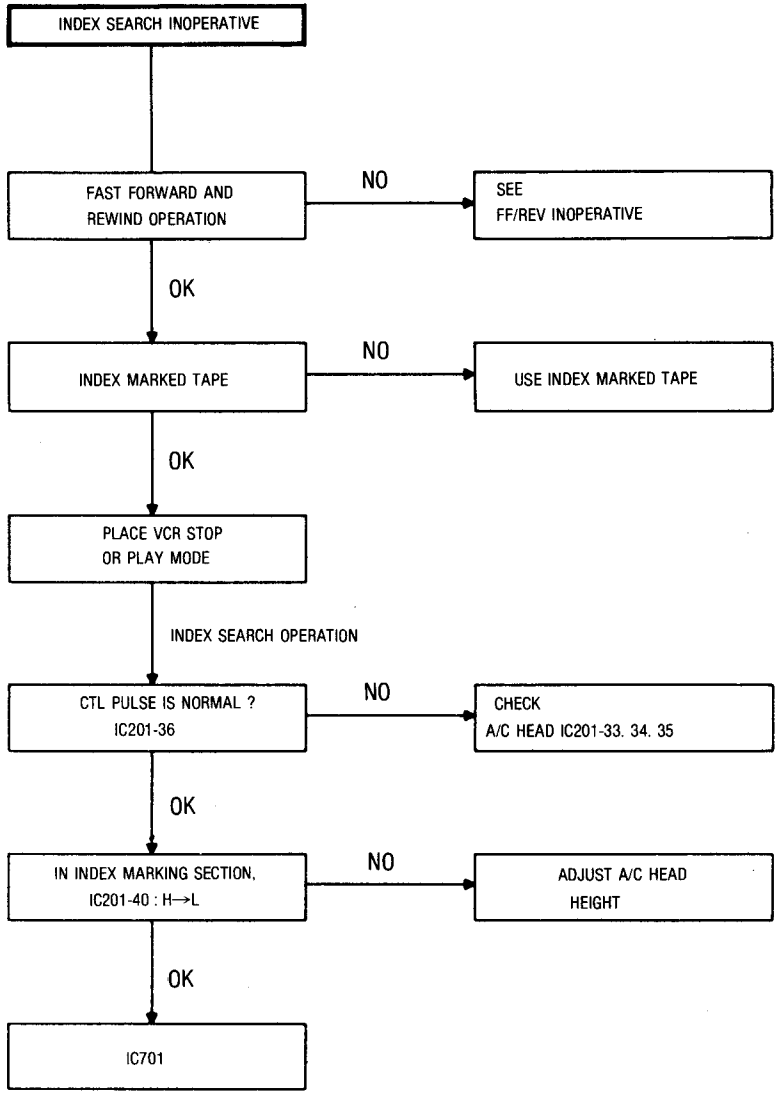


5-2 TROUBLESHOOTING GUIDE

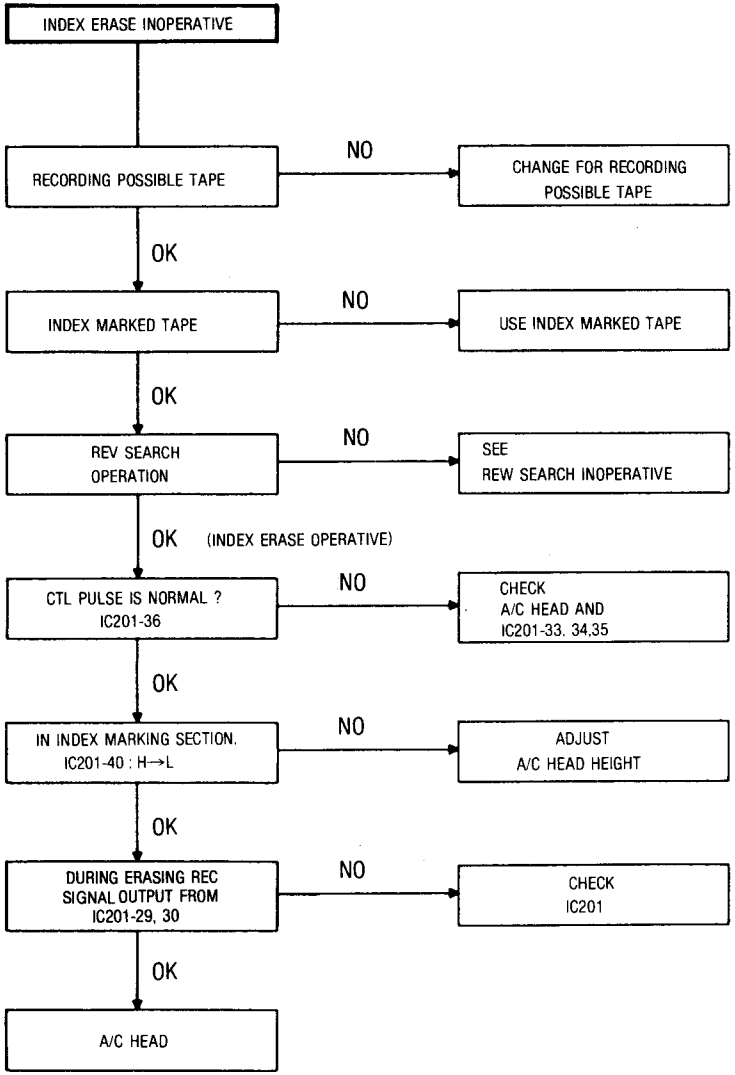
5-2-1.



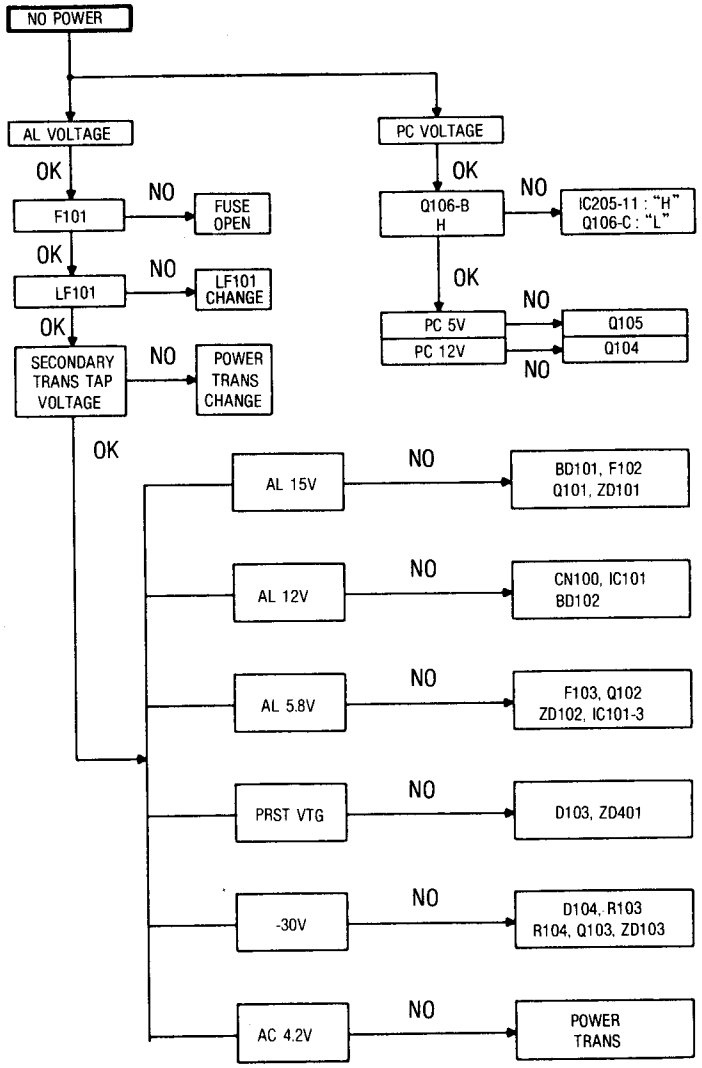
5-2-2.



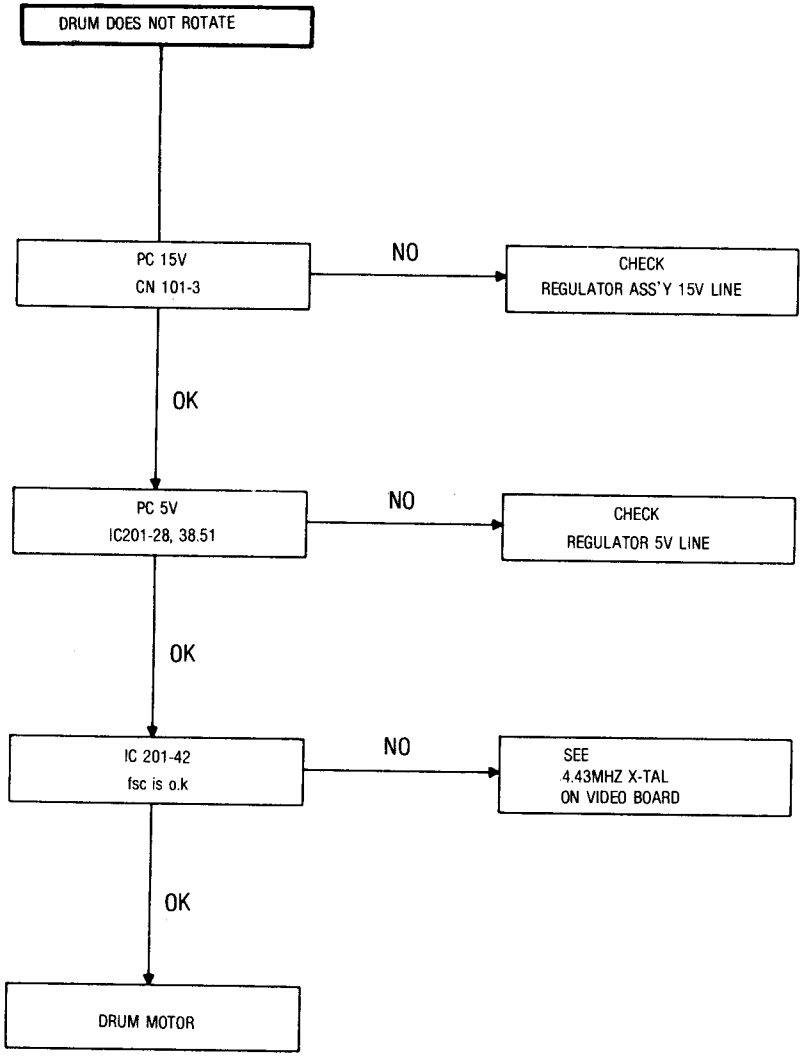
5-2-3.


INDEX ERASE INOPERATIVE
RECORDING POSSIBLE TAPE
NO
CHANGE FOR RECORDING POSSIBLE TAPE
OK
INDEX MARKED TAPE
NO
USE INDEX MARKED TAPE
OK
REV SEARCH OPERATION
NO
SEE REW SEARCH INOPERATIVE
OK (INDEX ERASE OPERATIVE)
CTL PULSE IS NORMAL ? IC201-36
NO
CHECK A/C HEAD AND IC201-33, 34,35
OK
IN INDEX MARKING SECTION. IC201-40 : H→L
NO
ADJUST A/C HEAD HEIGHT
OK
DURING ERASING REC SIGNAL OUTPUT FROM IC201-29, 30
NO
CHECK IC201
OK
A/C HEAD

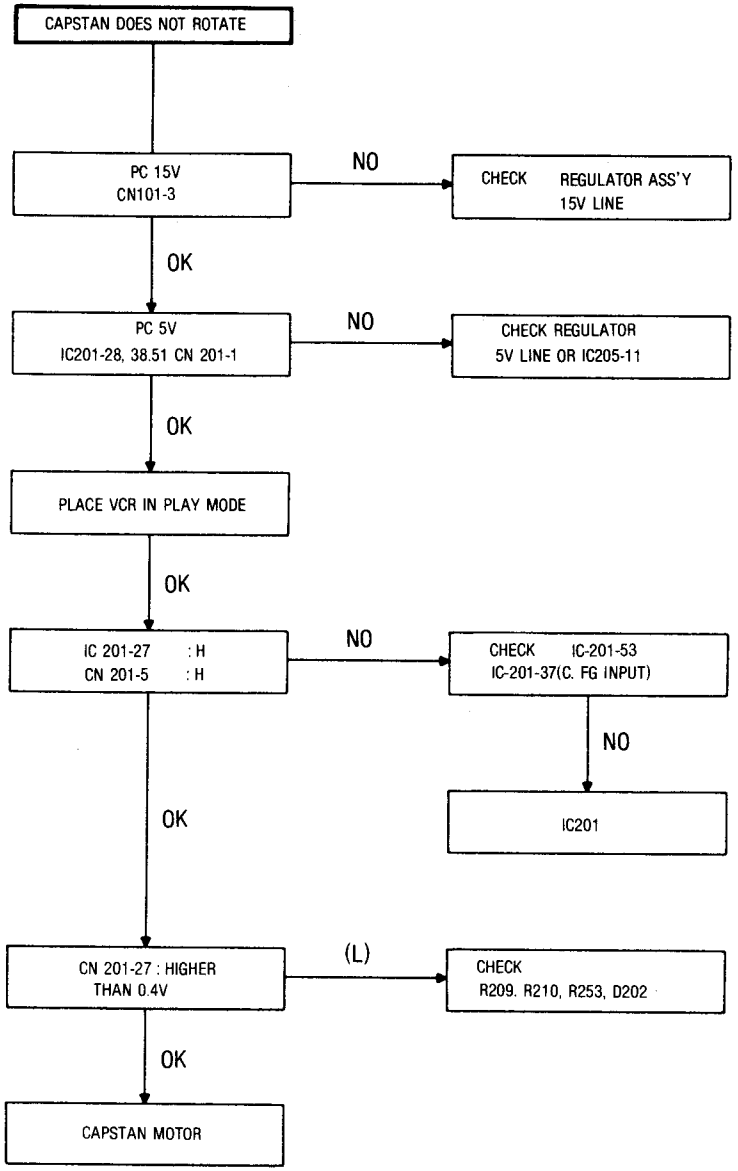
5-2-4.


NO POWER
AL VOLTAGE
OK
F101
NO
FUSE OPEN
OK
LF101
NO
LF101 CHANGE
OK
SECONDARY TRANS TAP VOLTAGE
NO
POWER TRANS CHANGE
OK
PC VOLTAGE
OK
Q106-B H
NO
IC205-11 : "H" Q106-C : "L"
OK
PC 5V
PC 12V
NO
Q105
Q104
NO
AL 15V
NO
BD101, F102 Q101, ZD101
AL 12V
NO
CN100, IC101 BD102
AL 5.8V
NO
F103, Q102 ZD102, IC101-3
PRST VTG
NO
D103, ZD401
-30V
NO
D104, R103 R104, Q103, ZD103
AC 4.2V
NO
POWER TRANS

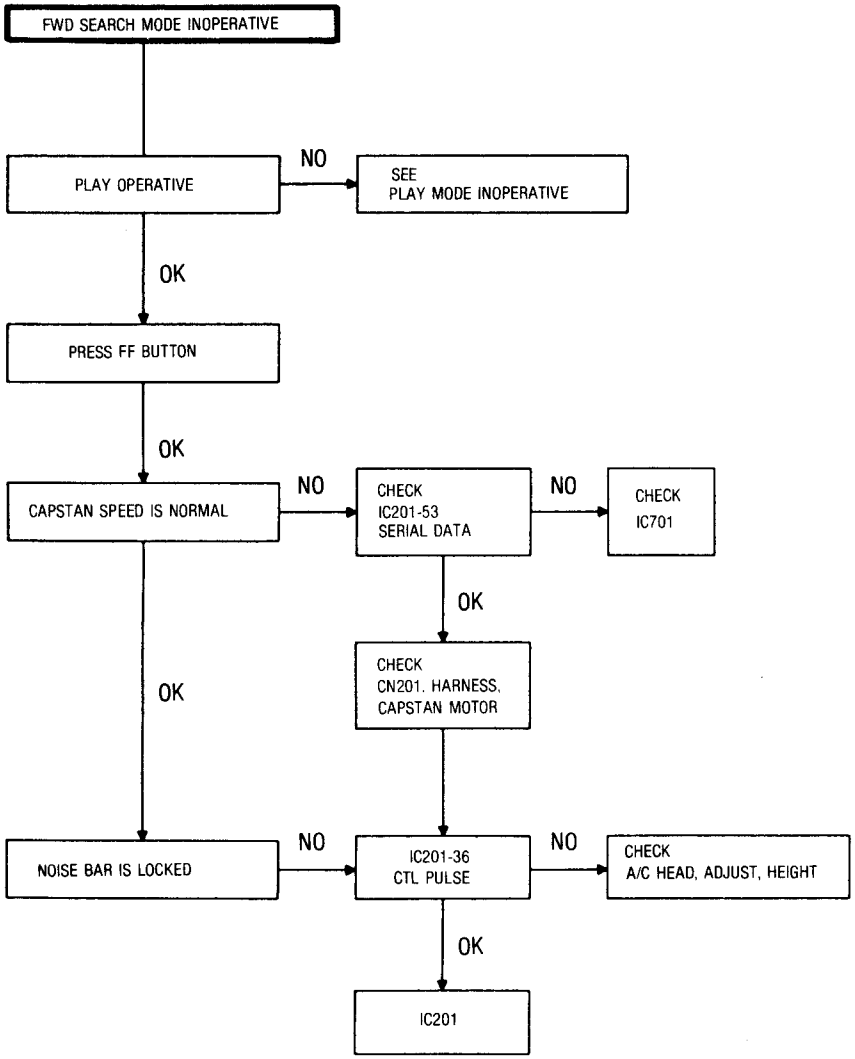
5-2-5.


DRUM DOES NOT ROTATE
PC 15V
CN 101-3
NO
CHECK
REGULATOR ASS'Y 15V LINE
OK
PC 5V
IC201-28, 38.51
NO
CHECK
REGULATOR 5V LINE
OK
IC 201-42
fsc is o.k
NO
SEE
4.43MHZ X-TAL
ON VIDEO BOARD
OK
DRUM MOTOR

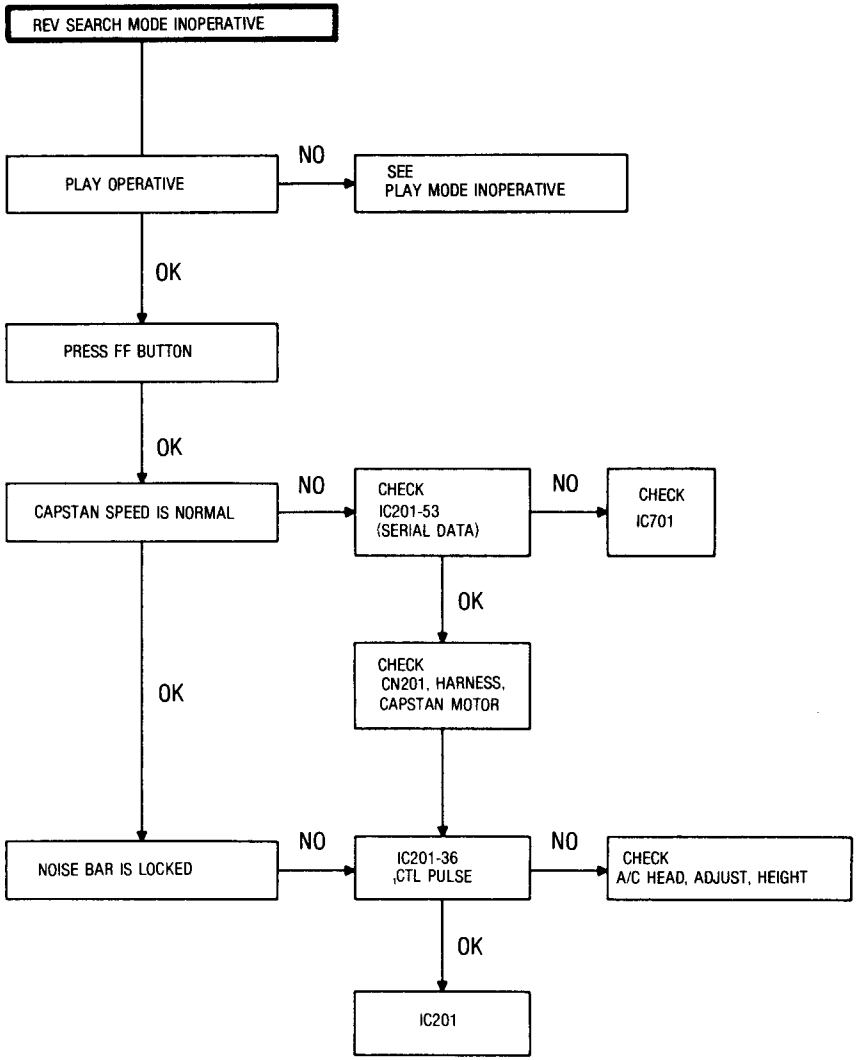
5-2-6.


CAPSTAN DOES NOT ROTATE
PC 15V
CN101-3
NO
CHECK REGULATOR ASS'Y
15V LINE
OK
PC 5V
IC201-28, 38.51 CN 201-1
NO
CHECK REGULATOR
5V LINE OR IC205-11
OK
PLACE VCR IN PLAY MODE
OK
IC 201-27 : H
CN 201-5 : H
NO
CHECK IC-201-53
IC-201-37(C. FG INPUT)
NO
IC201
OK
CN 201-27 : HIGHER
THAN 0.4V
(L)
CHECK
R209. R210, R253, D202
OK
CAPSTAN MOTOR

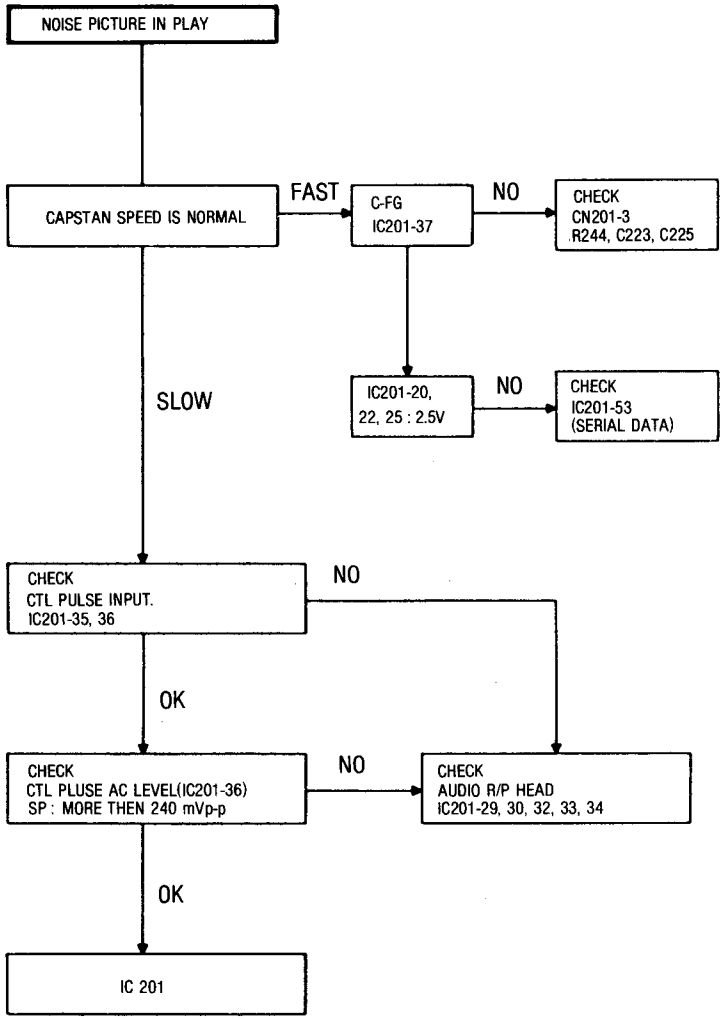
5-2-7.


FWD SEARCH MODE INOPERATIVE
PLAY OPERATIVE
NO
SEE
PLAY MODE INOPERATIVE
OK
PRESS FF BUTTON
OK
CAPSTAN SPEED IS NORMAL
NO
CHECK
IC201-53
SERIAL DATA
NO
CHECK
IC701
OK
CHECK
CN201, HARNESS,
CAPSTAN MOTOR
OK
NOISE BAR IS LOCKED
NO
IC201-36
CTL PULSE
NO
CHECK
A/C HEAD, ADJUST, HEIGHT
OK
IC201

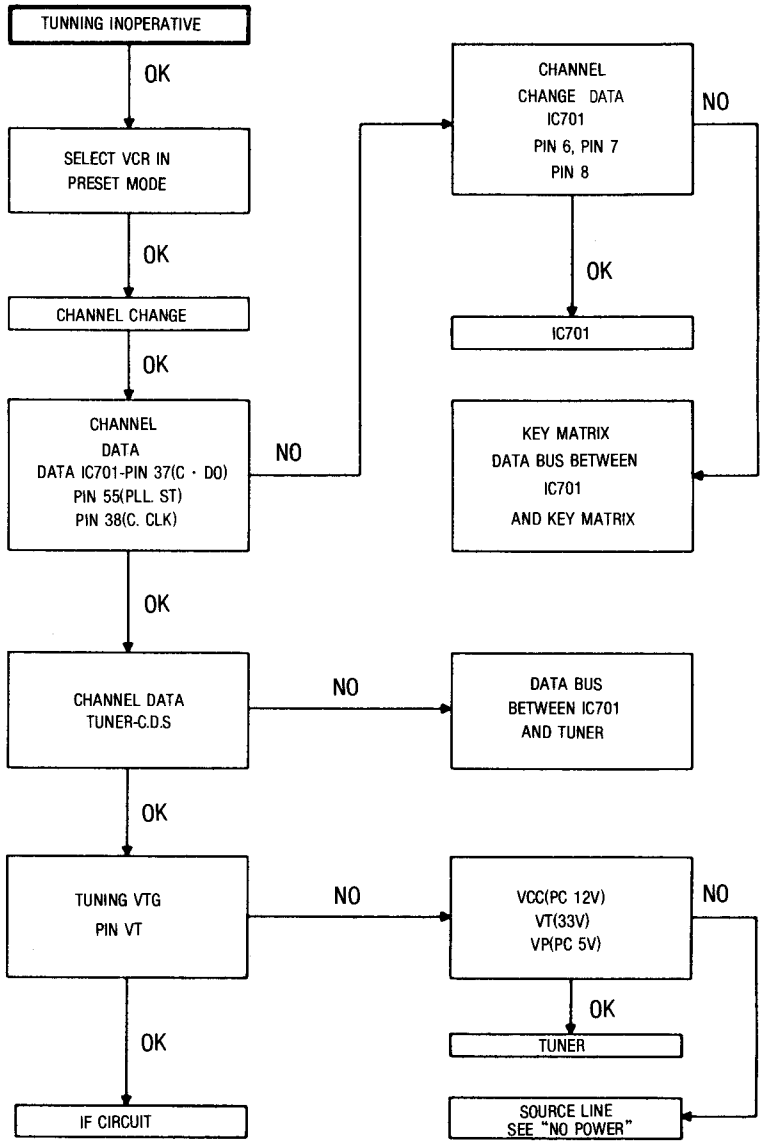
5-2-8.


REV SEARCH MODE INOPERATIVE
PLAY OPERATIVE
NO
SEE
PLAY MODE INOPERATIVE
OK
PRESS FF BUTTON
OK
CAPSTAN SPEED IS NORMAL
NO
CHECK
IC201-53
(SERIAL DATA)
NO
CHECK
IC701
OK
CHECK
CN201, HARNESS,
CAPSTAN MOTOR
OK
NOISE BAR IS LOCKED
NO
IC201-36
,CTL PULSE
NO
CHECK
A/C HEAD, ADJUST, HEIGHT
OK
IC201

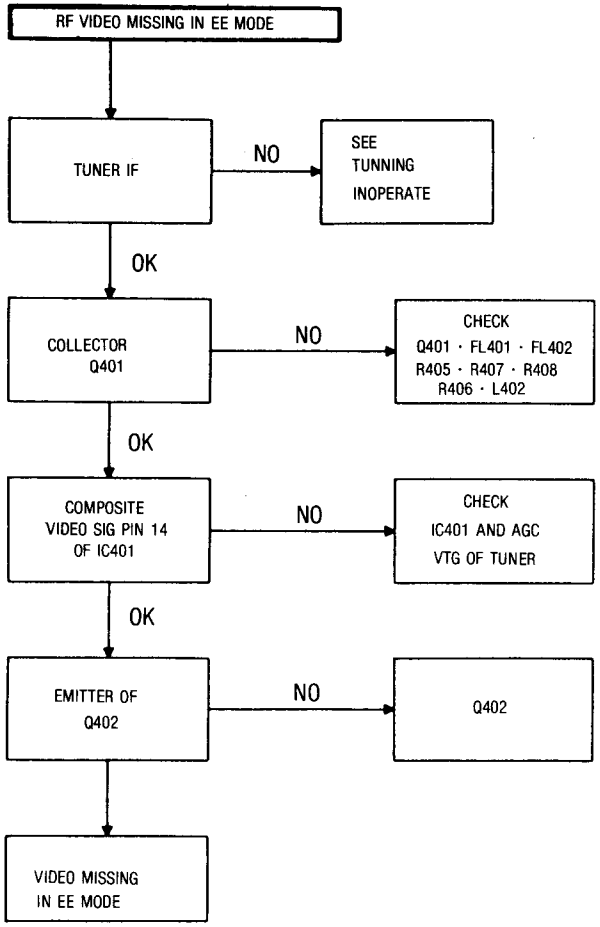
5-2-9.


NOISE PICTURE IN PLAY
CAPSTAN SPEED IS NORMAL
FAST
C-FG
IC201-37
NO
CHECK
CN201-3
R244, C223, C225
SLOW
IC201-20,
22, 25 : 2.5V
NO
CHECK
IC201-53
(SERIAL DATA)
CHECK
CTL PULSE INPUT.
IC201-35, 36
NO
OK
CHECK
CTL PLUSE AC LEVEL(IC201-36)
SP : MORE THEN 240 mVp-p
NO
CHECK
AUDIO R/P HEAD
IC201-29, 30, 32, 33, 34
OK
IC 201

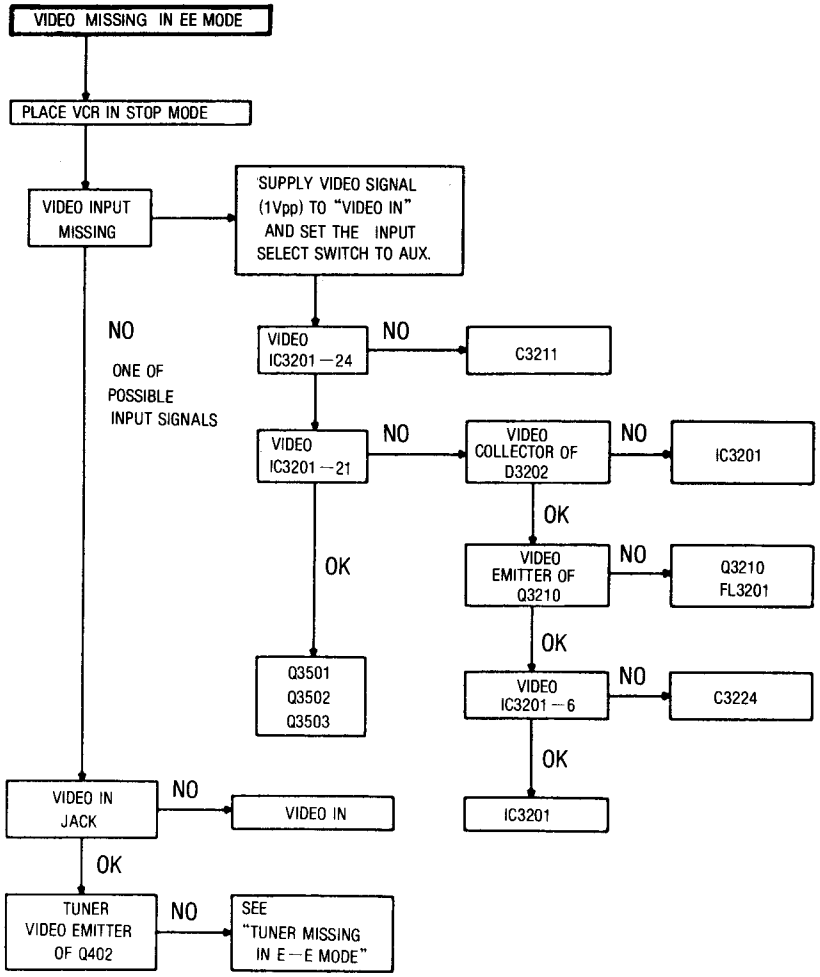
5-2-10.


TUNNING INOPERATIVE
OK
SELECT VCR IN
PRESET MODE
OK
CHANNEL CHANGE
OK
CHANNEL
DATA
DATA IC701-PIN 37(C · DO)
PIN 55(PLL ST)
PIN 38(C. CLK)
NO
CHANNEL
CHANGE DATA
IC701
PIN 6, PIN 7
PIN 8
NO
OK
IC701
KEY MATRIX
DATA BUS BETWEEN
IC701
AND KEY MATRIX
OK
CHANNEL DATA
TUNER-C.D.S
NO
DATA BUS
BETWEEN IC701
AND TUNER
OK
TUNING VTG
PIN VT
NO
VCC(PC 12V)
VT(33V)
VP(PC 5V)
NO
OK
TUNER
OK
IF CIRCUIT
SOURCE LINE
SEE "NO POWER"

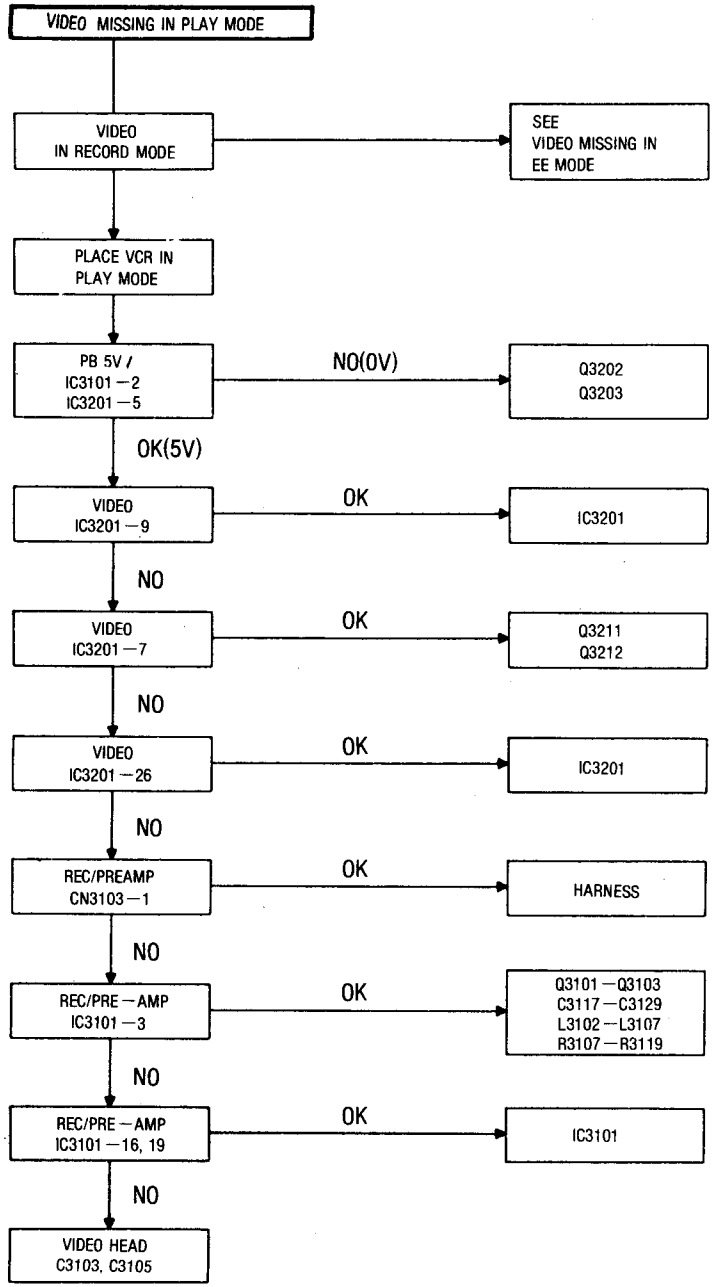
5-2-11.


RF VIDEO MISSING IN EE MODE
TUNER IF
NO
SEE TUNNING INOPERATE
OK
COLLECTOR Q401
NO
CHECK Q401 · FL401 · FL402 R405 · R407 · R408 R406 · L402
OK
COMPOSITE VIDEO SIG PIN 14 OF IC401
NO
CHECK IC401 AND AGC VTG OF TUNER
OK
EMITTER OF Q402
NO
Q402
VIDEO MISSING IN EE MODE

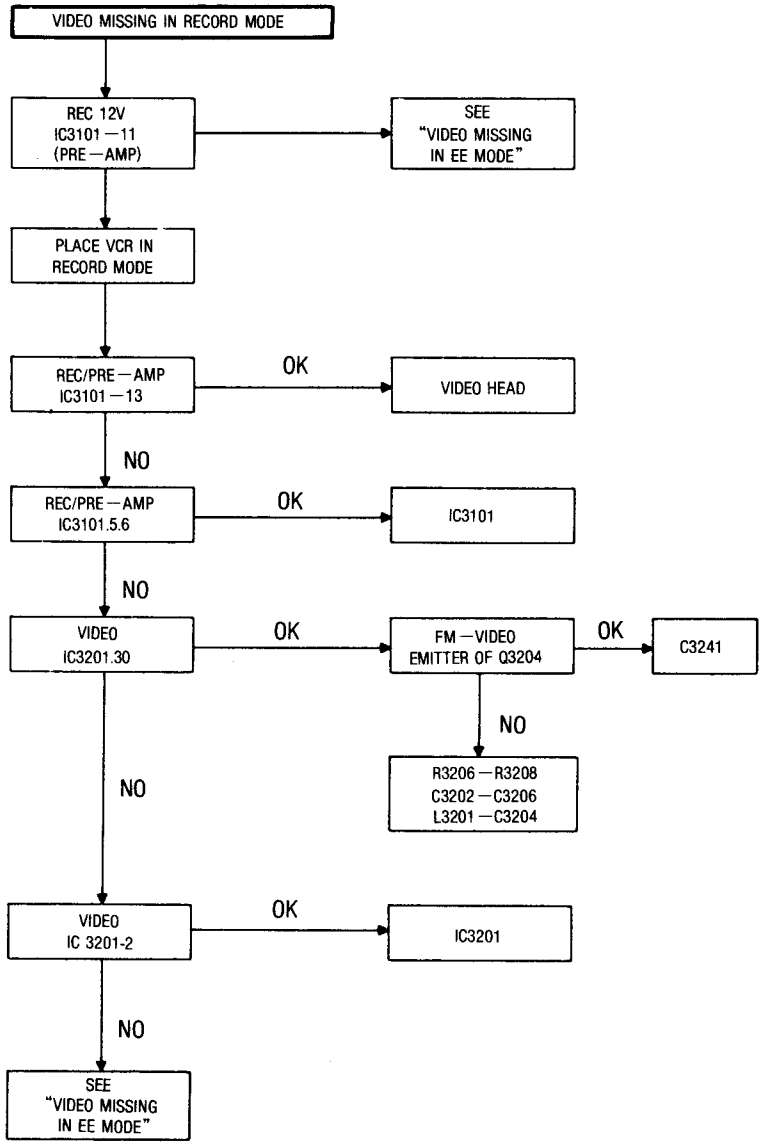
5-2-12.


VIDEO MISSING IN EE MODE
PLACE VCR IN STOP MODE
VIDEO INPUT MISSING
SUPPLY VIDEO SIGNAL (1Vpp) TO "VIDEO IN" AND SET THE INPUT SELECT SWITCH TO AUX.
NO
ONE OF POSSIBLE INPUT SIGNALS
VIDEO IC3201—24
NO
C3211
VIDEO IC3201—21
NO
VIDEO COLLECTOR OF D3202
NO
IC3201
OK
OK
VIDEO EMITTER OF Q3210
NO
Q3210 FL3201
OK
Q3501 Q3502 Q3503
VIDEO IC3201—6
NO
C3224
OK
IC3201
VIDEO IN JACK
NO
VIDEO IN
OK
TUNER VIDEO EMITTER OF Q402
NO
SEE "TUNER MISSING IN E—E MODE"

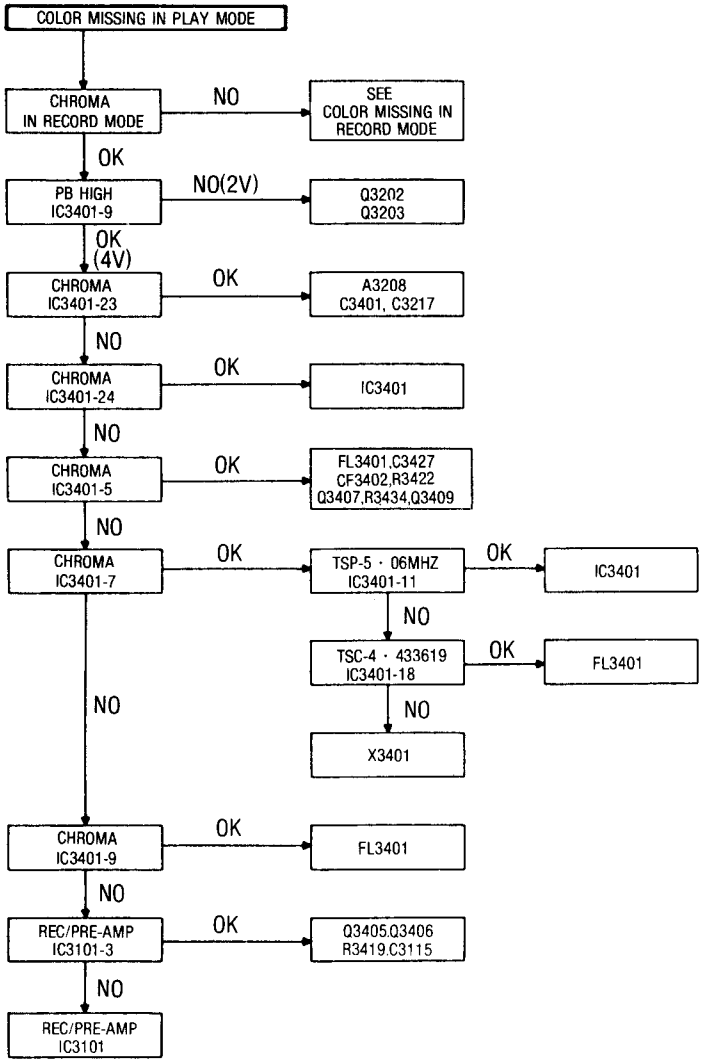
5-2-13.


VIDEO MISSING IN PLAY MODE
VIDEO IN RECORD MODE
SEE VIDEO MISSING IN EE MODE
PLACE VCR IN PLAY MODE
PB 5V / IC3101 — 2 IC3201 — 5
NO(0V)
Q3202 Q3203
OK(5V)
VIDEO IC3201 — 9
OK
IC3201
NO
VIDEO IC3201 — 7
OK
Q3211 Q3212
NO
VIDEO IC3201 — 26
OK
IC3201
NO
REC/PREAMP CN3103 — 1
OK
HARNESS
NO
REC/PRE — AMP IC3101 — 3
OK
Q3101 — Q3103 C3117 — C3129 L3102 — L3107 R3107 — R3119
NO
REC/PRE — AMP IC3101 — 16, 19
OK
IC3101
NO
VIDEO HEAD C3103, C3105

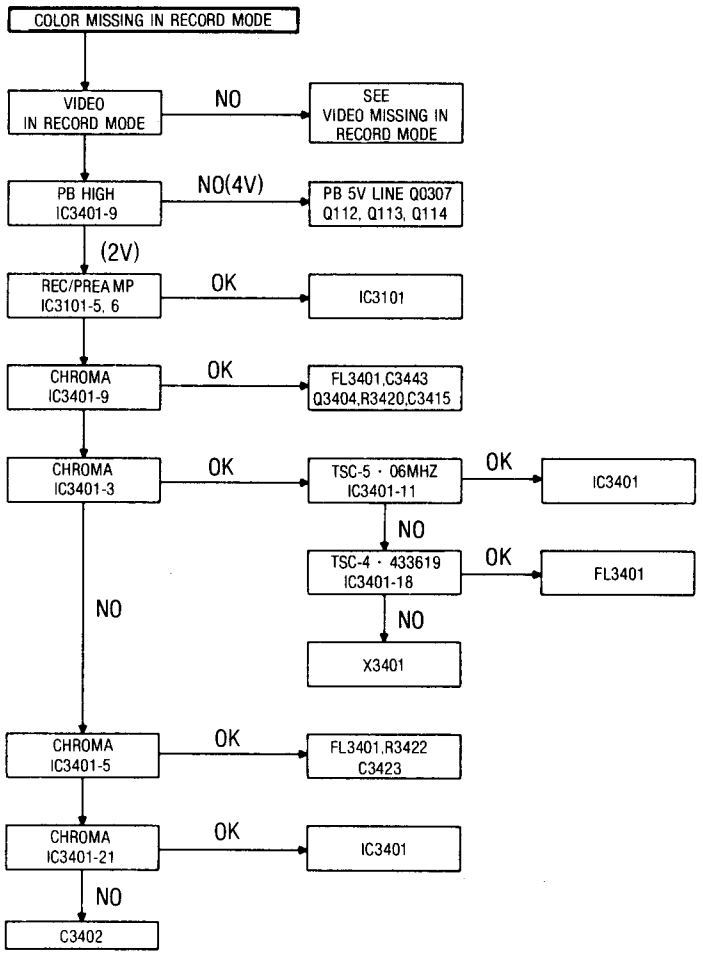
5-2-14.


VIDEO MISSING IN RECORD MODE
REC 12V IC3101 — 11 (PRE — AMP)
SEE "VIDEO MISSING IN EE MODE"
PLACE VCR IN RECORD MODE
REC/PRE — AMP IC3101 — 13
OK
VIDEO HEAD
NO
REC/PRE — AMP IC3101.5.6
OK
IC3101
NO
VIDEO IC3201.30
OK
FM — VIDEO EMITTER OF Q3204
OK
C3241
NO
R3206 — R3208 C3202 — C3206 L3201 — C3204
NO
VIDEO IC 3201-2
OK
IC3201
NO
SEE "VIDEO MISSING IN EE MODE"

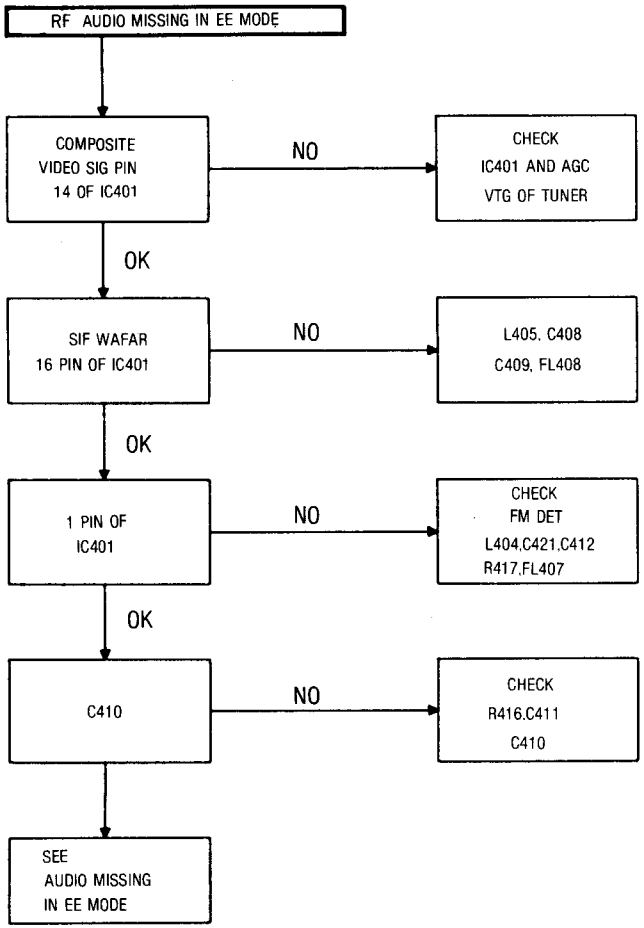
5-2-15.


COLOR MISSING IN PLAY MODE
CHROMA IN RECORD MODE
NO
SEE COLOR MISSING IN RECORD MODE
OK
PB HIGH IC3401-9
NO(2V)
Q3202 Q3203
OK (4V)
CHROMA IC3401-23
OK
A3208 C3401, C3217
NO
CHROMA IC3401-24
OK
IC3401
NO
CHROMA IC3401-5
OK
FL3401,C3427 CF3402,R3422 Q3407,R3434,Q3409
NO
CHROMA IC3401-7
OK
TSP-5 · 06MHZ IC3401-11
OK
IC3401
NO
TSC-4 · 433619 IC3401-18
OK
FL3401
NO
X3401
NO
CHROMA IC3401-9
OK
FL3401
NO
REC/PRE-AMP IC3101-3
OK
Q3405,Q3406 R3419,C3115
NO
REC/PRE-AMP IC3101

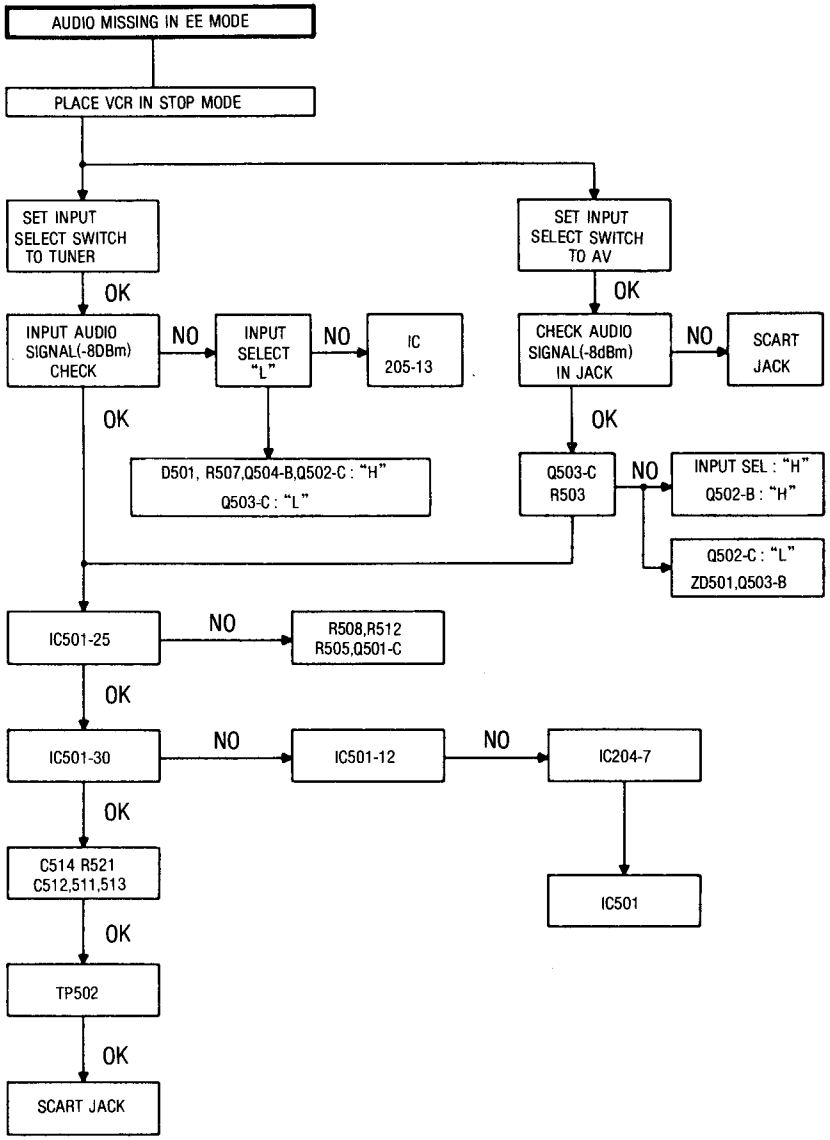
5-2-16.


COLOR MISSING IN RECORD MODE
VIDEO IN RECORD MODE
NO
SEE VIDEO MISSING IN RECORD MODE
PB HIGH IC3401-9
NO(4V)
PB 5V LINE Q0307 Q112, Q113, Q114
(2V)
REC/PREA MP IC3101-5, 6
OK
IC3101
CHROMA IC3401-9
OK
FL3401,C3443 Q3404,R3420,C3415
CHROMA IC3401-3
OK
TSC-5 · 06MHZ IC3401-11
OK
IC3401
NO
TSC-4 · 433619 IC3401-18
OK
FL3401
NO
X3401
NO
CHROMA IC3401-5
OK
FL3401,R3422 C3423
CHROMA IC3401-21
OK
IC3401
NO
C3402

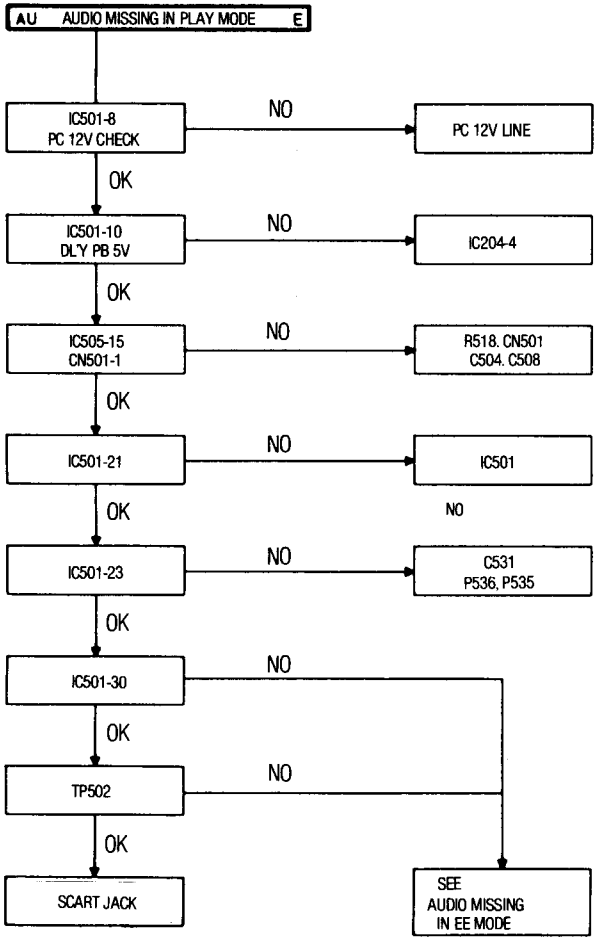
5-2-17.


RF AUDIO MISSING IN EE MODE
COMPOSITE VIDEO SIG PIN 14 OF IC401
NO
CHECK IC401 AND AGC VTG OF TUNER
OK
SIF WAFAR 16 PIN OF IC401
NO
L405, C408 C409, FL408
OK
1 PIN OF IC401
NO
CHECK FM DET L404,C421,C412 R417,FL407
OK
C410
NO
CHECK R416,C411 C410
SEE AUDIO MISSING IN EE MODE

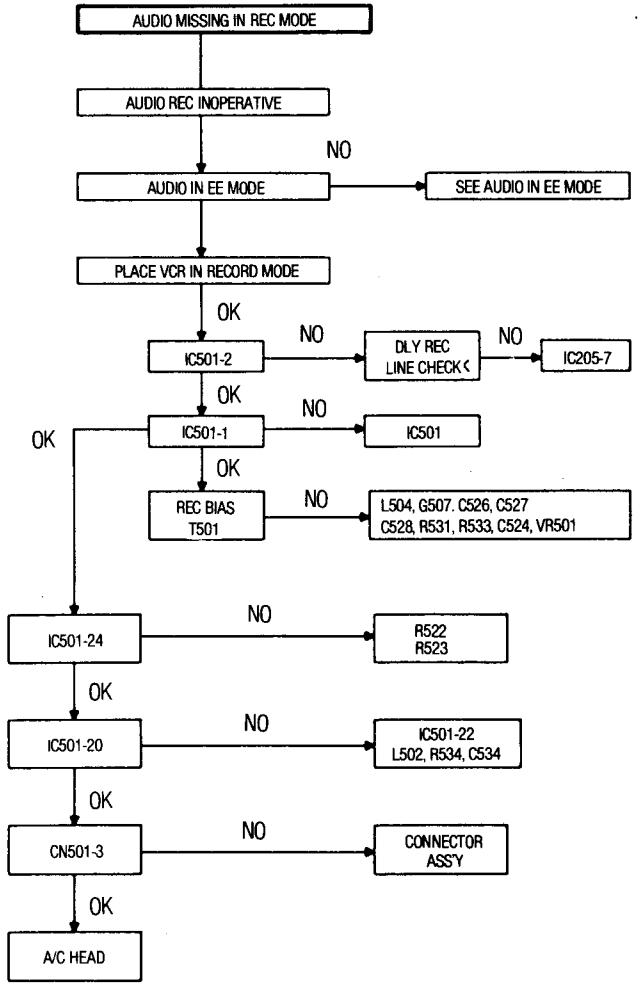
5-2-18.


AUDIO MISSING IN EE MODE
PLACE VCR IN STOP MODE
SET INPUT SELECT SWITCH TO TUNER
OK
INPUT AUDIO SIGNAL(-8DBm) CHECK
NO
INPUT SELECT "L"
NO
IC 205-13
OK
D501, R507,Q504-B,Q502-C : "H" Q503-C : "L"
SET INPUT SELECT SWITCH TO AV
OK
CHECK AUDIO SIGNAL(-8dBm) IN JACK
NO
SCART JACK
OK
Q503-C R503
NO
INPUT SEL : "H" Q502-B : "H"
Q502-C : "L" ZD501,Q503-B
IC501-25
NO
R508,R512 R505,Q501-C
OK
IC501-30
NO
IC501-12
NO
IC204-7
OK
C514 R521 C512,511,513
IC501
OK
TP502
OK
SCART JACK

5-2-19.


AU AUDIO MISSING IN PLAY MODE E
IC501-8 PC 12V CHECK
NO
PC 12V LINE
OK
IC501-10 DLY PB 5V
NO
IC204-4
OK
IC505-15 CN501-1
NO
R518. CN501 C504. C508
OK
IC501-21
NO
IC501
NO
OK
IC501-23
NO
C531 P536, P535
OK
IC501-30
NO
OK
TP502
NO
OK
SCART JACK
SEE AUDIO MISSING IN EE MODE

5-2-20


AUDIO MISSING IN REC MODE
AUDIO REC INOPERATIVE
NO
AUDIO IN EE MODE
SEE AUDIO IN EE MODE
PLACE VCR IN RECORD MODE
OK
IC501-2
NO
DLY REC LINE CHECK
NO
IC205-7
OK
IC501-1
NO
IC501
OK
REC BIAS T501
NO
L504, G507. C526, C527 C528, R531, R533, C524, VR501
OK
IC501-24
NO
R522 R523
OK
IC501-20
NO
IC501-22 L502, R534, C534
OK
CN501-3
NO
CONNECTOR ASS'Y
OK
A/C HEAD

6. REPLACEMENT PARTS LIST

1. Parts Replacement

Many electrical and mechanical parts in video cassette recorder(player) have special safety-related characteristics. These are after not evident from visual inspection nor the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by ⚠ in the replacement parts lists and schematic diagrams.
The use of a substitute replacement part which does not have the same safety characteristics as the factory recommanded replacement parts shown in this service manual may create shock, fire or other hazard.

2. Unless otherwise specified :

1) All resisters are in ohms(Ω), K=1,000, M=1,000K.

*RD : 1/8W, +/−5% Carbon

*RM : 1/4W, +/−5% Metal-film

2) All capacitors are in +/−10%, MF=uF.

*CC : PF=uuF, Ceramic, Temp

*CK : PK=uuF, Ceramic, MK

*CS : Tantalium

*CQ : Polyester

*CE : Electrolytic

3) All coils are in microhenries (uH), M=1,000uH.

3. ASS'Y=Assembly.

4. P.W.B=Printed Wiring Board.

5. ⚠ Mark : Safety related parts.

6. How to order replacement parts

To have your order filed promptly and correctly, please furnish the following informations.

1) Model Number

2) Location Number

3) Part Number

4) Description & Specification

7. P.W.B Assembly is not Replacement Item.

Location - Number	Supplier Parts-Number	Description & Specification
		A S S Y - M A I N X - 1 M V C R 2 H ' D
		P O W E R - P A R T S
C111	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C112	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C114	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C199	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
CN101	63053-110-125	LEAD CONNECTOR ASSY;1429 #26 5295-5264 10P 250m/m
D105	62169-406-482	DIODE;1N4148 SAMSUNG
D106	62169-201-050	DIODE;1N4001 TAPG
D108	62169-201-050	DIODE;1N4001 TAPG
D109	62169-201-050	DIODE;1N4001 TAPG
D110	62169-201-050	DIODE;1N4001 TAPG
D111	62169-406-482	DIODE;1N4148 SAMSUNG
Q104	62147-401-835	TRANSISTOR;KSA 928A-Y TAPG
Q105	62147-401-835	TRANSISTOR;KSA 928A-Y TAPG
Q106	62137-701-010	TRANSISTOR;KSR 1001 TAPG
Q107	62137-701-012	TRANSISTOR;KSR 1003 TAPG
Q108	62137-701-022	TRANSISTOR;KSR 2003 TAPG
R105	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R106	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R107	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R108	61048-177-681	R-METAL FILM;RM 1/8TS 680-J
R110	61048-277-821	R-METAL FILM;RM 1/4T 820-J
		S E R V O - P A R T S
C201	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C202	61507-121-340	C-POLYESTER;CQ921M TAPG 100V 102-K
C203	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C204	61507-121-430	C-POLYESTER;CQ921M TAPG 100V 472-K
C206	61507-121-550	C-POLYESTER;CQ921M TAPG 50V 473-K
C207	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C208	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C209	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C210	61507-121-550	C-POLYESTER;CQ921M TAPG 50V 473-K
C211	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C212	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C213	61507-121-340	C-POLYESTER;CQ921M TAPG 100V 102-K
C214	61507-121-570	C-POLYESTER;CQ921M TAPG 100V 683-K
C215	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C216	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C217	61417-109-040	C-CERAMIC.HK;CK45F TAPG 50V 102-Z
C218	61637-204-220	C-ELEC;CEAP 16V 22M SA
C219	61637-204-220	C-ELEC;CEAP 16V 22M SA
C220	61509-121-260	C-POLYESTER;CQ921M 100V 104-J
C221	61407-101-460	C-CERAMIC.TEMP;CC45 SL TAPG 50V 270-J
C222	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C224	61607-421-120	C-ELECTROLYTIC;LC-0511-4.7-50-M TAPG
C225	61507-121-600	C-POLYESTER;CQ921M TAPG 100V 563-K
C226	61417-109-040	C-CERAMIC.HK;CK45F TAPG 50V 102-Z
C228	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C233	61507-121-481	C-POLTESTER;CQ921M TAPG 50V 153-J
C234	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C235	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C236	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C237	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C238	61407-117-101	C-CERAMIC.AXIAL;UP050F 104Z
C239	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C240	61407-117-101	C-CERAMIC.AXIAL;UP050F 104Z
C241	61617-404-470	C-ELEC;CEAP 16V 47M RSS(6.3X7)
C242	61637-504-471	C-ELEC;CEAP 16V 470M SG(10X12.5)

Location - Number	Supplier Parts-Number	Description & Specification
C243	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C244	61417-109-200	C-CERAMIC.HK;CK45F TAPG 50V 473-Z
C245	61637-504-101	C-ELEC;CEAP 16V 100M SG(6.3X11)
C246	61407-101-460	C-CERAMIC.TEMP;CC45 SL TAPG 50V 270-J
C248	61407-101-460	C-CERAMIC.TEMP;CC45 SL TAPG 50V 270-J
C249	61417-109-040	C-CERAMIC.HK;CK45F TAPG 50V 102-Z
C251	61407-101-460	C-CERAMIC.TEMP;CC45 SL TAPG 50V 270-J
CN202	63053-916-298	LEAD CONNECTOR ASSY;1429 #26 6P 250m/m
CN204	63053-207-126	LEAD CONNECTOR ASSY;1429 #26 5295-51004 7P 260m/m
CN205	63348-231-200	CONNECTOR-WAFER;5532-20A
CN206	63348-231-200	CONNECTOR-WAFER;5532-20A
D202	62169-406-482	DIODE;1N4148 SAMSUNG
D205	62169-406-482	DIODE;1N4148 SAMSUNG
D206	62169-406-482	DIODE;1N4148 SAMSUNG
D208	62169-406-482	DIODE;1N4148 SAMSUNG
D209	62169-406-482	DIODE;1N4148 SAMSUNG
D210	62169-406-482	DIODE;1N4148 SAMSUNG
D211	62169-406-482	DIODE;1N4148 SAMSUNG
D212	62169-201-050	DIODE;1N4001 TAPG
D213	62169-201-050	DIODE;1N4001 TAPG
D214	62169-406-482	DIODE;1N4148 SAMSUNG
D215	62169-406-482	DIODE;1N4148 SAMSUNG
D216	62169-406-482	DIODE;1N4148 SAMSUNG
D217	62169-406-482	DIODE;1N4148 SAMSUNG
D220	62169-406-482	DIODE;1N4148 SAMSUNG
D250	62169-406-482	DIODE;1N4148 SAMSUNG
IC201	62119-401-862	IC;HD49748NT
IC202	62119-401-872	IC;LM393(N.M)
IC203	62119-501-572	IC-LINEAR;LM358S(N.M)
IC204	62119-101-770	IC;TC4094BP/CD4094BCN
IC205	62119-101-770	IC;TC4094BP/CD4094BCN
IC206	62119-401-300	IC;KA8301(N.M)
L201	62429-833-101	COIL-PEAKING AXIAL;BAL04ST 101K
Q205	62137-701-012	TRANSISTOR;KSR 1003 TAPG
Q209	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q210	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
Q211	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
Q212	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q213	62137-701-012	TRANSISTOR;KSR 1003 TAPG
Q214	62137-701-013	TRANSISTOR;KSR 1004 TAPG
Q215	62147-401-835	TRANSISTOR;KSA 928A-Y TAPG
Q216	62147-401-830	TRANSISTOR;KSD 261-Y TAPG
Q217	62137-701-022	TRANSISTOR;KSR 2003 TAPG
Q218	62137-701-013	TRANSISTOR;KSR 1004 TAPG
Q219	62137-701-023	TRANSISTOR;KSR 2004 TAPG
R201	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R202	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R203	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R204	61048-177-823	R-METAL FILM;RM 1/8TS 82K-J
R205	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R206	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R207	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R208	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R209	61048-177-152	R-METAL FILM;RM 1/8TS 1.5K-J
R210	61048-177-302	R-METAL FILM;RM 1/8TS 3K-J
R211	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R212	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R214	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
R217	61048-177-184	R-METAL FILM;RM 1/8TS 180K-J
R218	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R219	61048-177-564	R-METAL FILM;RM 1/8TS 560K-J

Location - Number	Supplier Parts-Number	Description & Specification
R220	61048-177-182	R-METAL FILM;RM 1/8TS 1.8K-J
R221	61048-177-203	R-METAL FILM;RM 1/8TS 20K-J
R222	61048-177-105	R-METAL FILM;RM 1/8TS 1M-J
R223	61048-177-683	R-METAL FILM;RM 1/8TS 68K-J
R224	61048-177-334	R-METAL FILM;RM 1/8TS 330K-J
R225	61048-177-105	R-METAL FILM;RM 1/8TS 1M-J
R226	61048-177-393	R-METAL FILM;RM 1/8TS 39K-J
R227	61048-177-564	R-METAL FILM;RM 1/8TS 560K-J
R228	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R229	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R230	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R231	61048-177-473	R-METAL FILM;RM 1/8TS 47K-J
R232	61048-177-105	R-METAL FILM;RM 1/8TS 1M-J
R233	61048-177-183	R-METAL FILM;RM 1/8TS 18K-J
R234	61048-177-154	R-METAL FILM;RM 1/8TS 150K-J
R235	61048-177-563	R-METAL FILM;RM 1/8TS 56K-J
R236	61048-177-474	R-METAL FILM;RM 1/8TS 470K-J
R237	61048-177-224	R-METAL FILM;RM 1/8TS 220K-J
R238	61048-177-823	R-METAL FILM;RM 1/8TS 82K-J
R239	61048-177-822	R-METAL FILM;RM 1/8TS 8.2K-J
R240	61048-177-511	R-METAL FILM;RM 1/8TS 510-J
R241	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R242	61048-177-105	R-METAL FILM;RM 1/8TS 1M-J
R243	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R244	61048-177-820	R-METAL FILM;RM 1/8TS 82-J
R251	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R252	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R253	61048-177-752	R-METAL FILM;RM 1/8TS 7.5K-J
R254	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R255	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R256	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R257	61048-177-101	R-METAL FILM;RM 1/8TS 100-J
R258	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
R259	61049-427-010	R-METAL OXIDE;RS 1P 1-J
R260	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R261	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R262	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R263	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R264	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R265	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R266	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R267	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R269	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R270	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R275	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R276	61048-177-302	R-METAL FILM;RM 1/8TS 3K-J
R277	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R278	61048-177-122	R-METAL FILM;RM 1/8TS 1.2K-J
R279	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R280	61048-177-330	R-METAL FILM;RM 1/8TS 33-J
R281	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R282	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
R283	61048-177-302	R-METAL FILM;RM 1/8TS 3K-J
R284	61048-177-473	R-METAL FILM;RM 1/8TS 47K-J
R285	61048-177-473	R-METAL FILM;RM 1/8TS 47K-J
R289	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R291	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R292	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R293	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R294	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J

Location - Number	Supplier Parts-Number	Description & Specification
R295	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R296	61048-177-823	R-METAL FILM;RM 1/8TS 82K-J
R609	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R610	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R611	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R612	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
TP201	65104-702-610	PIN TEST POINT;BSW 1/2H PI0.9 SN5.5
VR201	61247-101-104	VR-SEMI;EVN-DJA A03 B15 TAPG 100KB
	V I D E O - P A R T S	
C3201	61637-204-330	C-ELEC;CEAP 16V 33M SA(5X11)
C3202	61407-101-160	C-CERAMIC.TEMP;CC45 SL TAPG 50V 15-J
C3203	61407-103-680	C-CERAMIC.TEMP;CG45 PH TAPG 50V 68-J
C3204	61407-101-380	C-CERAMIC.TEMP;CC45 SL TAPG 50V 120-J
C3205	61407-105-680	C-CERAMIC.TEMP;CC45 CH TAPG 50V 200-J
C3206	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3207	61407-105-250	C-CERAMIC.TEMP;CC45 CH TAPG 50V 39-J
C3208	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C3209	61637-208-478	C-ELEC;CEAP 50V 0.47M SA(5X11)
C3210	61637-204-220	C-ELEC;CEAP 16V 22M SA
C3211	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C3212	61637-208-229	C-ELEC;CEAP 50V 2.2M SA (5X11)
C3213	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C3214	61637-504-101	C-ELEC;CEAP 16V 100M SG(6.3X11)
C3215	61407-101-160	C-CERAMIC.TEMP;CC45 SL TAPG 50V 15-J
C3216	61407-101-510	C-CERAMIC.TEMP;CC45 SL TAPG 50V 470-J
C3217	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3218	61507-121-570	C-POLYESTER;CQ921M TAPG 100V 683-K
C3219	61407-105-280	C-CERAMIC.TEMP;CC45 CH TAPG 50V 56-J
C3220	61407-101-360	C-CERAMIC.TEMP;CC45 SL TAPG 50V 100-J
C3222	61637-208-478	C-ELEC;CEAP 50V 0.47M SA(5X11)
C3223	61607-421-120	C-ELECTROLYTIC;LC-0511-4.7-50-M TAPG
C3224	61637-208-478	C-ELEC;CEAP 50V 0.47M SA(5X11)
C3225	61407-101-160	C-CERAMIC.TEMP;CC45 SL TAPG 50V 15-J
C3227	61407-101-490	C-CERAMIC.TEMP;CC45 SL TAPG 50V 390-J
C3228	61407-105-660	C-CERAMIC.TEMP;CG45 CH TAPG 50V 5-D
C3229	61407-101-440	C-CERAMIC.TEMP;CC45 SL TAPG 50V 220-J
C3230	61407-101-483	C-CERAMIC.TEMP;CC45 SL TAPG 50V 47-J
C3231	61407-101-200	C-CERAMIC.TEMP;CC45 SL TAPG 50V 22-J
C3232	61407-101-170	C-CERAMIC.TEMP;CC45 SL TAPG 50V 150-J
C3233	61637-504-101	C-ELEC;CEAP 16V 100M SG(6.3X11)
C3234	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3235	61507-121-470	C-POLYESTER;CQ921M TAPG 100V 103-K
C3236	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3237	61637-608-338	C-ELEC;CEAP 50V 0.33M SV(5X9)
C3238	61607-421-120	C-ELECTROLYTIC;LC-0511-4.7-50-M TAPG
C3239	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C3240	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C3241	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3242	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3243	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3245	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3250	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C3401	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3402	61407-101-360	C-CERAMIC.TEMP;CC45 SL TAPG 50V 100-J
C3403	61637-504-101	C-ELEC;CEAP 16V 100M SG(6.3X11)
C3404	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3405	61407-105-320	C-CERAMIC.TEMP;CC45 CH TAPG 50V 82-J
C3406	61407-105-360	C-CERAMIC.TEMP;CC45 CH TAPG 50V 43-J
C3407	61507-121-470	C-POLYESTER;CQ921M TAPG 100V 103-K
C3408	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)

Location - Number	Supplier Parts-Number	Description & Specification
C3410	61507-121-570	C-POLYESTER;CQ921M TAPG 100V 683-K
C3411	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3412	61507-121-510	C-POLYESTER;CQ921M TAPG 100V 223-K
C3413	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C3414	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C3415	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3416	61407-101-360	C-CERAMIC.TEMP;CC45 SL TAPG 50V 100-J
C3417	61507-121-430	C-POLYESTER;CQ921M TAPG 100V 472-K
C3418	61507-121-550	C-POLYESTER;CQ921M TAPG 50V 473-K
C3419	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3420	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C3421	61407-101-360	C-CERAMIC.TEMP;CC45 SL TAPG 50V 100-J
C3422	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C3423	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3424	61507-121-550	C-POLYESTER;CQ921M TAPG 50V 473-K
C3425	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3427	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3429	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3430	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C3432	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3433	61407-101-483	C-CERAMIC.TEMP;CC45 SL TAPG 50V 47-J
C3434	61637-204-330	C-ELEC;CEAP 16V 33M SA(5X11)
C3435	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C3436	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C3437	61407-105-320	C-CERAMIC.TEMP;CC45 CH TAPG 50V 82-J
C3438	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3502	61617-404-470	C-ELEC;CEAP 16V 47M RSS(6.3X7)
C3504	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C3505	61637-504-221	C-ELEC;CEAP 16V 220M SG(8X11.5)
C3506	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C3508	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C3509	61637-504-471	C-ELEC;CEAP 16V 470M SG(10X12.5)
C3510	61407-105-320	C-CERAMIC.TEMP;CC45 CH TAPG 50V 82-J
C3511	61407-105-320	C-CERAMIC.TEMP;CC45 CH TAPG 50V 82-J
C3520	61407-105-320	C-CERAMIC.TEMP;CC45 CH TAPG 50V 82-J
CF3402	64569-006-011	DELAY LINE;MS-31PC-5K
CN3101	63348-231-040	CONNECTOR-WAFER;52045-0410
CN3102	63349-601-041	CONNECTOR WAFER;5234-05A
CN3103	63054-611-300	FLAT-CABLE;2760 #26 2.0C-11P-300m/m
CN3201	63348-232-110	CONNECTOR-WAFER;52147-1110
D3201	62169-406-482	DIODE;1N4148 SAMSUNG
D3202	62169-406-482	DIODE;1N4148 SAMSUNG
D3401	62169-406-482	DIODE;1N4148 SAMSUNG
FL3201	64529-431-091	FILTER-LC DIP TYPE;CQ0003
FL3401	64529-401-200	FILTER-LC;SFB 4141
FL3402	64529-310-010	FILTER-CERAMIC;SFE 4.5MB
IC3101	62119-103-661	IC;LA7320
IC3201	62119-103-662	IC;LA7323
IC3202	62119-701-063	IC;MSM7401RS
IC3401	62119-103-718	IC;LA7333
IC3402	62119-103-694	IC;BA7025L
IC3501	62119-401-310	IC;KA8403
L3012	62427-812-221	COIL-PEAKING;EL0606RA 220uH-J
L3201	62427-812-180	COIL-PEAKING;EL0606RA 18uH-J
L3202	62427-812-220	COIL-PEAKING;EL0606RA 22uH-J
L3203	62427-812-101	COIL-PEAKING;EL0606RA 100uH-J
L3204	62427-812-221	COIL-PEAKING;EL0606RA 220uH-J
L3205	62429-833-101	COIL-PEAKING AXIAL;BAL04ST 101K
L3206	62427-812-470	COIL-PEAKING;EL0606RA 47uH-J
L3207	62427-812-151	COIL-PEAKING;EL0606RA 150uH-J
L3208	62427-812-101	COIL-PEAKING;EL0606RA 100uH-J

Location - Number	Supplier Parts-Number	Description & Specification
L3209	62427-812-101	COIL-PEAKING;EL0606RA 100uH-J
L3401	62429-833-101	COIL-PEAKING AXIAL;BAL04ST 101K
L3402	62427-812-309	COIL-PEAKING;EL0606RA 3uH-K
L3403	62427-812-180	COIL-PEAKING;EL0606RA 18uH-J
L3404	62427-812-101	COIL-PEAKING;EL0606RA 100uH-J
L3405	62427-813-822	COIL-PEAKING;EL0607RA 8200uH-J
L3406	62427-812-101	COIL-PEAKING;EL0606RA 100uH-J
L3408	62427-812-150	COIL-PEAKING;EL0606RA 15uH-J
L3409	62427-812-220	COIL-PEAKING;EL0606RA 22uH-J
L3502	62427-812-821	COIL-PEAKING;EL0606RA 820uH-J
Q3201	62137-701-011	TRANSISTOR;KSR 1002 TAPG
Q3202	62137-701-011	TRANSISTOR;KSR 1002 TAPG
Q3203	62147-101-950	TRANSISTOR;KSA 643-Y TAPG
Q3204	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3205	62137-701-023	TRANSISTOR;KSR 2004 TAPG
Q3206	62137-701-023	TRANSISTOR;KSR 2004 TAPG
Q3208	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
Q3210	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
Q3211	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3212	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3213	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
Q3214	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3215	62147-401-850	TRANSISTOR;DTA 143ES TAPG
Q3216	62137-701-011	TRANSISTOR;KSR 1002 TAPG
Q3217	62147-101-950	TRANSISTOR;KSA 643-Y TAPG
Q3401	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
Q3402	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3404	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
Q3405	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3406	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3407	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3409	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3411	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
Q3413	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3414	62137-701-013	TRANSISTOR;KSR 1004 TAPG
Q3416	62137-701-013	TRANSISTOR;KSR 1004 TAPG
Q3501	62137-702-020	TRANSISTOR;KSC 1008-Y TAPG
Q3502	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
R3201	61048-177-203	R-METAL FILM;RM 1/8TS 20K-J
R3202	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R3203	61048-177-223	R-METAL FILM;RM 1/8TS 22K-J
R3204	61048-177-473	R-METAL FILM;RM 1/8TS 47K-J
R3205	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R3206	61048-177-181	R-METAL FILM;RM 1/8TS 180-J
R3207	61048-177-821	R-METAL FILM;RM 1/8TS 820-J
R3209	61048-177-182	R-METAL FILM;RM 1/8TS 1.8K-J
R3210	61048-177-182	R-METAL FILM;RM 1/8TS 1.8K-J
R3211	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3212	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R3214	61048-177-153	R-METAL FILM;RM 1/8TS 15K-J
R3215	61048-177-153	R-METAL FILM;RM 1/8TS 15K-J
R3216	61048-177-823	R-METAL FILM;RM 1/8TS 82K-J
R3217	61048-177-123	R-METAL FILM;RM 1/8TS 12K-J
R3219	61048-177-122	R-METAL FILM;RM 1/8TS 1.2K-J
R3220	61048-177-681	R-METAL FILM;RM 1/8TS 680-J
R3221	61048-177-333	R-METAL FILM;RM 1/8TS 33K-J
R3222	61048-177-821	R-METAL FILM;RM 1/8TS 820-J
R3223	61048-177-152	R-METAL FILM;RM 1/8TS 1.5K-J
R3225	61048-177-682	R-METAL FILM;RM 1/8TS 6.8K-J
R3227	61048-177-475	R-METAL FILM;RM 1/8TS 4.7M-J
R3228	61048-177-105	R-METAL FILM;RM 1/8TS 1M-J

Location - Number	Supplier Parts-Number	Description & Specification
R3229	61048-177-105	R-METAL FILM;RM 1/8TS 1M-J
R3231	61048-177-681	R-METAL FILM;RM 1/8TS 680-J
R3232	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
R3233	61048-177-392	R-METAL FILM;RM 1/8TS 3.9K-J
R3235	61048-177-682	R-METAL FILM;RM 1/8TS 6.8K-J
R3236	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3237	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
R3238	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3239	61048-177-112	R-METAL FILM;RM 1/8TS 1.1K-J
R3240	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R3241	61048-177-112	R-METAL FILM;RM 1/8TS 1.1K-J
R3242	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
R3243	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
R3244	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R3247	61048-177-561	R-METAL FILM;RM 1/8TS 560-J
R3248	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3249	61048-177-152	R-METAL FILM;RM 1/8TS 1.5K-J
R3401	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3402	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3403	61048-177-224	R-METAL FILM;RM 1/8TS 220K-J
R3404	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R3405	61048-177-152	R-METAL FILM;RM 1/8TS 1.5K-J
R3406	61048-177-392	R-METAL FILM;RM 1/8TS 3.9K-J
R3407	61048-177-822	R-METAL FILM;RM 1/8TS 8.2K-J
R3408	61048-177-223	R-METAL FILM;RM 1/8TS 22K-J
R3409	61048-177-122	R-METAL FILM;RM 1/8TS 1.2K-J
R3409	61048-177-122	R-METAL FILM;RM 1/8TS 1.2K-J
R3410	61048-177-223	R-METAL FILM;RM 1/8TS 22K-J
R3411	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3412	61048-177-153	R-METAL FILM;RM 1/8TS 15K-J
R3413	61048-177-273	R-METAL FILM;RM 1/8TS 27K-J
R3414	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3415	61048-177-273	R-METAL FILM;RM 1/8TS 27K-J
R3416	61048-177-123	R-METAL FILM;RM 1/8TS 12K-J
R3417	61048-177-331	R-METAL FILM;RM 1/8TS 330-J
R3418	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3419	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3420	61048-177-681	R-METAL FILM;RM 1/8TS 680-J
R3421	61048-177-331	R-METAL FILM;RM 1/8TS 330-J
R3422	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3423	61048-177-392	R-METAL FILM;RM 1/8TS 3.9K-J
R3424	61048-177-152	R-METAL FILM;RM 1/8TS 1.5K-J
R3425	61048-177-391	R-METAL FILM;RM 1/8TS 390-J
R3426	61048-177-221	R-METAL FILM;RM 1/8TS 220-J
R3427	61048-177-821	R-METAL FILM;RM 1/8TS 820-J
R3430	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3431	61048-177-473	R-METAL FILM;RM 1/8TS 47K-J
R3434	61048-177-271	R-METAL FILM;RM 1/8TS 270-J
R3437	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R3438	61048-177-332	R-METAL FILM;RM 1/8TS 3.3K-J
R3439	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3441	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R3442	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3443	61048-177-823	R-METAL FILM;RM 1/8TS 82K-J
R3444	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R3445	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R3446	61048-177-153	R-METAL FILM;RM 1/8TS 15K-J
R3447	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R3448	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R3450	61048-177-154	R-METAL FILM;RM 1/8TS 150K-J
R3451	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J

Location - Number	Supplier Parts-Number	Description & Specification
R3452	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3453	61048-177-223	R-METAL FILM;RM 1/8TS 22K-J
R3455	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R3501	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R3502	61048-177-820	R-METAL FILM;RM 1/8TS 82-J
R3503	61048-177-750	R-METAL FILM;RM 1/8TS 75-J
R3504	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R3506	61048-177-471	R-METAL FILM;RM 1/8TS 470-J
R3508	61048-177-471	R-METAL FILM;RM 1/8TS 470-J
R3509	61048-177-750	R-METAL FILM;RM 1/8TS 75-J
R3512	61048-177-151	R-METAL FILM;RM 1/8TS 150-J
R3513	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3515	61048-177-391	R-METAL FILM;RM 1/8TS 390-J
T3401	62429-014-112	COIL-TRAP(1/2FH);7.8K TUNING-COIL
TP3204	65104-702-610	PIN TEST POINT;BSW 1/2H PI0.9 SN5.5
VR3201	61247-101-472	VR-SEMI;EVN-DJA A03 BQ3 TAPG 4.7KB
VR3202	61247-101-472	VR-SEMI;EVN-DJA A03 BQ3 TAPG 4.7KB
VR3203	61247-101-102	VR-SEMI;EVN-DJA A03 B13 TAPG 1KB
VR3204	61246-105-102	VR-SEMI;RH0615C 1K
VR3205	61247-101-222	VR-SEMI;EVN-DJA A03 BE3 TAPG 2.2KB
W3203	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
X3401	64539-012-079	X-TAL;4.43 3619MHZ 8PPM TAPG
ZD3201	62169-403-301	DIODE-ZENER;UZ 3.0B TAPG
	T U N E R - P A R T S	
	34519-903-170	TUNER;TERE7-008A
C400	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C401	61407-105-270	C-CERAMIC.TEMP;CC45 CH TAPG 50V 27-J
C402	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C403	61407-105-270	C-CERAMIC.TEMP;CC45 CH TAPG 50V 27-J
C404	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C405	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C406	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C407	61407-105-250	C-CERAMIC.TEMP;CC45 CH TAPG 50V 39-J
C408	61407-101-200	C-CERAMIC.TEMP;CC45 SL TAPG 50V 22-J
C409	61407-105-250	C-CERAMIC.TEMP;CC45 CH TAPG 50V 39-J
C410	61607-421-120	C-ELECTROLYTIC;LG-0511-4.7-50-M TAPG
C411	61507-121-390	C-POLYESTER;CQ921M TAPG 100V 222-K
C412	61507-121-470	C-POLYESTER;CQ921M TAPG 100V 103-K
C413	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C414	61607-421-130	C-ELECTROLYTIC;LG-0511-47-16-M TAPG
C415	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C416	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C417	61407-101-160	C-CERAMIC.TEMP;CC45 SL TAPG 50V 15-J
C418	61507-121-920	C-POLYESTER;CQ921M TAPG 100V 104-M
C419	61617-408-478	C-ELEC;CEAP 50V 0.47M RSS(4X7)
C420	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C421	61417-101-110	C-CERAMIC.TEMP;CC45 SL TAPG 50V 6-D
C422	61617-404-100	C-ELEC;CEAP 16V 10M RSS(4X7)
C423	61407-105-850	C-CERAMIC.TEMP;CC45 CH TAPG 50V 8-D
C424	61407-105-660	C-CERAMIC.TEMP;CC45 CH TAPG 50V 5-D
C431	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
CN402	63053-108-660	LEAD CONNECTOR ASSY;1533 #26 5295-5264 8P 600mm
CN402-P	63349-120-010	PIN-CONNECTOR(G7);MAIN TO SUB 7PIN
FL401	62429-832-021	COIL-TRAP;DAISIN 40.4MHZ(G-10)
FL402	62429-832-009	COIL-TRAP;DAISIN 32.4MHZ(G-10)
FL403	62429-832-080	COIL VARIABLE;1.2UH PSF MATCH
FL404	62719-049-012	TRANS-RESONANT(TI);40MHZ V-DET
FL405	64529-421-022	CERAMIC-TRAP;TPS 6.5MB
FL406	64529-421-021	CERAMIC-TRAP;TPS-5.5MB

Location - Number	Supplier Parts-Number	Description & Specification
FL407	64529-425-070	FILTER-CERAMIC;CDA 5.5ME21
FL408	64529-310-012	FILTER-CERAMIC;SFE-5.5MB
FL409	62719-049-013	TRANS-AFT(T2);40MHZ AFT-BAL
FL410	64529-418-101	FILTER-SAW;TSF-1303M
IC401	62119-103-721	IC;LA7545
L401	62427-812-188	COIL PEAKING;EL0606RA 0.47uH-M
L402	62427-812-229	COIL-PEAKING;EL0606RA 2.2uH-K
L404	62427-812-180	COIL-PEAKING;EL0606RA 18uH-J
L405	62427-812-220	COIL-PEAKING;EL0606RA 22uH-J
L406	62427-812-180	COIL-PEAKING;EL0606RA 18uH-J
L407	62427-812-150	COIL-PEAKING;EL0606RA 15uH-J
L410	62427-812-100	COIL-PEAKING;EL0606RA 10uH-J
Q401	62137-702-010	TRANSISTOR;KTC 388ATM
Q402	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
R401	61048-177-101	R-METAL FILM;RM 1/8TS 100-J
R402	61048-177-220	R-METAL FILM;RM 1/8TS 22-J
R403	61048-177-101	R-METAL FILM;RM 1/8TS 100-J
R404	61048-177-331	R-METAL FILM;RM 1/8TS 330-J
R405	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R406	61048-177-681	R-METAL FILM;RM 1/8TS 680-J
R407	61048-177-122	R-METAL FILM;RM 1/8TS 1.2K-J
R408	61048-177-820	R-METAL FILM;RM 1/8TS 82-J
R409	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R410	61048-177-152	R-METAL FILM;RM 1/8TS 1.5K-J
R411	61048-177-271	R-METAL FILM;RM 1/8TS 270-J
R412	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
R413	61048-177-151	R-METAL FILM;RM 1/8TS 150-J
R414	61048-177-151	R-METAL FILM;RM 1/8TS 150-J
R415	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R416	61048-177-393	R-METAL FILM;RM 1/8TS 39K-J
R417	61048-177-821	R-METAL FILM;RM 1/8TS 820-J
R418	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R419	61048-177-224	R-METAL FILM;RM 1/8TS 220K-J
R420	61048-177-224	R-METAL FILM;RM 1/8TS 220K-J
R421	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R422	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R423	61048-177-123	R-METAL FILM;RM 1/8TS 12K-J
R424	61048-324-122	R-METAL FILM;RM 1/2P 1.2K-J
R425	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
VR401	61247-101-103	VR-SEMI;EVN-DJA A03 B14 TAPG 10KB
ZD401	62169-403-859	DIODE-ZENER;EQB01-33V(10COMW)TAPG
	A U D I O - P A R T S	
C501	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C502	61507-121-470	C-POLYESTER;CQ921M TAPG 100V 103-K
C503	61637-204-330	C-ELEC;CEAP 16V 33M SA(5X11)
C504	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C508	61507-121-371	C-POLYESTER;CQ921M TAPG 50V 182-J
C509	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C511	61507-121-480	C-POLYESTER;CQ921M TAPG 100V 153-K
C512	61507-121-430	C-POLYESTER;CQ921M TAPG 100V 472-K
C513	61507-121-470	C-POLYESTER;CQ921M TAPG 100V 103-K
C514	61607-421-120	C-ELECTROLYTIC;LC-0511-4.7-50-M TAPG
C518	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
C520	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C522	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C523	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C524	61407-101-480	C-CERAMIC.TEMP;CC45 SL TAPG 50V 330-J
C525	61507-339-010	C-POLYESTER;MDX 100V TAPG 473-K
C526	61607-421-130	C-ELECTROLYTIC;LC-0511-47-16-M TAPG
C527	61507-121-430	C-POLYESTER;CQ921M TAPG 100V 472-K

Location - Number	Supplier Parts-Number	Description & Specification
C528	61507-121-450	C-POLYESTER;CQ921M TAPG 50V 682-K
C529	61617-404-100	C-ELEC;CEAP 16V 10M RSS(4X7)
C530	61507-121-630	C-POLTESTER;CQ921M TAPG 100V 123-K
C531	61637-208-229	C-ELEC;CEAP 50V 2.2M SA (5X11)
C534	61507-121-470	C-POLYESTER;CQ921M TAPG 100V 103-K
C535	61417-104-282	C-CERAMIC.HK;CK45B TAPG 50V 102-K
C536	61417-104-282	C-CERAMIC.HK;CK45B TAPG 50V 102-K
CN501	63053-917-493	LEAD CONNECTOR ASSY;1533 #26 5231-07/500mm
D501	62169-406-482	DIODE;1N4148 SAMSUNG
IC501	62119-103-685	IC;LA7295
L500	62427-812-221	COIL-PEAKING;EL0606RA 220uH-J
L501	62429-010-280	COIL-PEAKING;BOAM-22mH
L502	62427-814-153	COIL-PEAKING;EL0607SK1 15MH-J
L503	62429-833-101	COIL-PEAKING AXIAL;BAL04ST 101K
L504	62427-813-101	COIL-PEAKING;EL0607RA 100uH-K
L505	62429-014-464	FERRITE BEAD CORE ASSY;VK-1260
L506	62429-014-464	FERRITE BEAD CORE ASSY;VK-1260
Q501	62137-701-011	TRANSISTOR;KSR 1002 TAPG
Q502	62137-701-011	TRANSISTOR;KSR 1002 TAPG
Q503	62137-702-020	TRANSISTOR;KSC 1008-Y TAPG
Q504	62137-702-020	TRANSISTOR;KSC 1008-Y TAPG
Q507	62137-702-020	TRANSISTOR;KSC 1008-Y TAPG
R501	61048-177-561	R-METAL FILM;RM 1/8TS 560-J
R502	61048-177-183	R-METAL FILM;RM 1/8TS 18K-J
R503	61048-177-273	R-METAL FILM;RM 1/8TS 27K-J
R504	61048-177-333	R-METAL FILM;RM 1/8TS 33K-J
R505	61048-177-273	R-METAL FILM;RM 1/8TS 27K-J
R506	61048-177-273	R-METAL FILM;RM 1/8TS 27K-J
R507	61048-177-332	R-METAL FILM;RM 1/8TS 3.3K-J
R508	61048-177-273	R-METAL FILM;RM 1/8TS 27K-J
R509	61048-177-223	R-METAL FILM;RM 1/8TS 22K-J
R510	61048-177-822	R-METAL FILM;RM 1/8TS 8.2K-J
R511	61048-177-475	R-METAL FILM;RM 1/8TS 4.7M-J
R512	61048-177-512	R-METAL FILM;RM 1/8TS 5.1K-J
R513	61048-177-334	R-METAL FILM;RM 1/8TS 330K-J
R514	61048-177-822	R-METAL FILM;RM 1/8TS 8.2K-J
R515	61048-177-101	R-METAL FILM;RM 1/8TS 100-J
R518	61048-177-473	R-METAL FILM;RM 1/8TS 47K-J
R521	61048-177-471	R-METAL FILM;RM 1/8TS 470-J
R522	61048-177-333	R-METAL FILM;RM 1/8TS 33K-J
R523	61048-177-332	R-METAL FILM;RM 1/8TS 3.3K-J
R527	61048-177-203	R-METAL FILM;RM 1/8TS 20K-J
R529	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R531	61048-177-303	R-METAL FILM;RM 1/8TS 30K-J
R533	61048-177-479	R-METAL FILM;RM 1/8TS 4.7-J
R534	61048-177-471	R-METAL FILM;RM 1/8TS 470-J
R535	61048-177-682	R-METAL FILM;RM 1/8TS 6.8K-J
R536	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R537	61048-177-561	R-METAL FILM;RM 1/8TS 560-J
R538	61048-177-132	R-METAL FILM;RM 1/8TS 1.3K-J
R539	61048-177-132	R-METAL FILM;RM 1/8TS 1.3K-J
R540	61048-177-683	R-METAL FILM;RM 1/8TS 68K-J
T501	62429-014-143	COIL-BIAS OSC;M-8G
VR501	61247-101-473	VR-SEMI;EVN-DXA A03 BQ4 TAPG 47KB
ZD501	62169-403-821	DIODE-ZENER;MTZ 5.1B
	A S S Y - V P S	
	69056-601-203	ASSY-VPS ; X-1 PAL VX-1561(4H'D)
C6101	61417-104-282	C-CERAMIC.HK;CK45B TAPG 50V 102-K
C6102	61407-101-510	C-CERAMIC.TEMP;CC45 SL TAPG 50V 470-J

Location - Number	Supplier Parts-Number	Description & Specification
C6103	61507-121-430	C-POLYESTER;CQ921M TAPG 100V 472-K
C6104	61507-121-260	C-POLYESTER;CQ921M TAPG 50V 104-J
C6105	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C6106	61617-404-470	C-ELEC;CEAP 16V 47M RSS(6.3X7)
C6107	61507-121-470	C-POLYESTER;CQ921M TAPG 100V 103-K
C6108	61507-121-530	C-POLYESTER;CQ921M TAPG 100V 333-K
CN6101	63349-120-010	PIN-CONNECTOR(G7);MAIN TO SUB 7PIN
IC6101	62119-403-013	IC;SAA4700(VPS)
L6101	62429-833-101	COIL-PEAKING AXIAL;BAL04ST 101K
R6101	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R6102	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R6103	61048-177-913	R-METAL FILM;RM 1/8TS 91K-J
R6104	61048-177-362	R-METAL FILM;RM 1/8TS 3.6K-J
R6109	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R6110	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R6111	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
	A S S Y - T I M E R	
151	39171-302-216	ASSY-F/TIMER;X-1 PAL MVCR
PWB(S.N.A)	63005-701-493	PWB F/TIMER ; 94V0 1.6X246.9X213(MVR-4500) PAL
C701	61617-404-470	C-ELEC;CEAP 16V 47M RSS(6.3X7)
C703	61617-404-100	C-ELEC;CEAP 16V 10M RSS(4X7)
C705	61617-404-470	C-ELEC;CEAP 16V 47M RSS(6.3X7)
C706	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C707	61407-105-270	C-CERAMIC.TEMP;CC45 CH TAPG 50V 27-J
C708	61407-105-270	C-CERAMIC.TEMP;CC45 CH TAPG 50V 27-J
CN701	63348-232-110	CONNECTOR-WAFER;52147-1110
CN702	63348-125-200	CONNECTOR-HOUSING;5533-20APB
CN703	63348-125-200	CONNECTOR-HOUSING;5533-20APB
CN704	63054-611-030	FLAT-CABLE;2760 #26 2.0C-11P-30m/m
D701	62169-406-482	DIODE;1N4148 SAMSUNG
D702	62169-406-482	DIODE;1N4148 SAMSUNG
D703	62169-406-482	DIODE;1N4148 SAMSUNG
D704	62169-406-482	DIODE;1N4148 SAMSUNG
D705	62169-406-482	DIODE;1N4148 SAMSUNG
D706	62169-406-482	DIODE;1N4148 SAMSUNG
D707	62169-406-482	DIODE;1N4148 SAMSUNG
D708	62169-406-482	DIODE;1N4148 SAMSUNG
D709	62169-406-482	DIODE;1N4148 SAMSUNG
D710	62169-406-482	DIODE;1N4148 SAMSUNG
D718	62169-406-482	DIODE;1N4148 SAMSUNG
D720	62169-406-482	DIODE;1N4148 SAMSUNG
D721	62169-423-092	DIODE-ZENER;MTZ 6.8B
D725	62169-406-482	DIODE;1N4148 SAMSUNG
DT701	62319-013-110	DIGITRON;14-BT-18GK
IC702	62119-401-186	IC;KM93C46
IC703	62119-103-676	IC;MN1280-Q
IC704	62119-401-314	IC;KIA7033P
L701	62429-833-101	COIL-PEAKING AXIAL;BAL04ST 101K
Q701	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
R701	61048-277-101	R-METAL FILM;RM 1/4T 100-J
R702	61048-277-101	R-METAL FILM;RM 1/4T 100-J
R703	61048-177-103	R-METAL FILM;RM 1/8TS 10K-J
R704	61048-177-104	R-METAL FILM;RM 1/8TS 100K-J
R705	61048-177-473	R-METAL FILM;RM 1/8TS 47K-J
R708	61048-177-511	R-METAL FILM;RM 1/8TS 510-J
R709	61048-177-683	R-METAL FILM;RM 1/8TS 68K-J
R711	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R712	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R713	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J

Location - Number	Supplier Parts-Number	Description & Specification
R714	61048-177-154	R-METAL FILM;RM 1/8TS 150K-J
R715	61048-177-154	R-METAL FILM;RM 1/8TS 150K-J
R716	61048-177-154	R-METAL FILM;RM 1/8TS 150K-J
R717	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R718	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R719	61048-177-683	R-METAL FILM;RM 1/8TS 68K-J
R720	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R721	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R722	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R727	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R751	61048-177-683	R-METAL FILM;RM 1/8TS 68K-J
R752	61048-177-683	R-METAL FILM;RM 1/8TS 68K-J
R753	61048-177-683	R-METAL FILM;RM 1/8TS 68K-J
R754	61048-177-683	R-METAL FILM;RM 1/8TS 68K-J
RM701	64529-312-041	REMOCON-MODULE;SBX1610-82
SW701	63599-016-070	SW-TACT;EVQ-QS2 05K
SW702	63599-016-070	SW-TACT;EVQ-QS2 05K
SW703	63599-016-070	SW-TACT;EVQ-QS2 05K
SW704	63599-016-070	SW-TACT;EVQ-QS2 05K
SW705	63599-016-070	SW-TACT;EVQ-QS2 05K
SW706	63599-016-070	SW-TACT;EVQ-QS2 05K
SW707	63599-016-070	SW-TACT;EVQ-QS2 05K
SW708	63599-016-070	SW-TACT;EVQ-QS2 05K
SW709	63599-016-070	SW-TACT;EVQ-QS2 05K
SW710	63599-016-070	SW-TACT;EVQ-QS2 05K
SW711	63599-016-070	SW-TACT;EVQ-QS2 05K
SW712	63599-016-070	SW-TACT;EVQ-QS2 05K
SW713	63599-016-070	SW-TACT;EVQ-QS2 05K
SW714	63599-016-070	SW-TACT;EVQ-QS2 05K
SW715	63599-016-070	SW-TACT;EVQ-QS2 05K
SW716	63599-016-070	SW-TACT;EVQ-QS2 05K
SW717	63599-016-070	SW-TACT;EVQ-QS2 05K
SW718	63599-016-070	SW-TACT;EVQ-QS2 05K
SW719	63599-016-070	SW-TACT;EVQ-QS2 05K
SW720	63599-016-070	SW-TACT;EVQ-QS2 05K
SW721	63599-016-070	SW-TACT;EVQ-QS2 05K
SW722	63599-016-070	SW-TACT;EVQ-QS2 05K
SW723	63599-016-070	SW-TACT;EVQ-QS2 05K
SW724	63599-016-070	SW-TACT;EVQ-QS2 05K
SW725	63599-016-070	SW-TACT;EVQ-QS2 05K
SW726	63599-016-070	SW-TACT;EVQ-QS2 05K
SW727	63599-016-070	SW-TACT;EVQ-QS2 05K
SW729	63599-016-070	SW-TACT;EVQ-QS2 05K
VR701	61203-107-032	VR-ROUND;VA09CH1U15F 20KB
XT702	64539-021-010	CRYSTAL;P-3(32.768KHZ)
	A S S Y - P W B J O I N T	
T242	69000-290-232	ASSY PCB JOINT(R);DX1-NR2
C6204	61637-208-339	C-ELEC;CEAP 50V 3.3M SA(5X11)
CN6201	63349-604-170	CONNECTOR WAFER;53014-0710
CN6202	63349-604-130	CONNECTOR WAFER;53014-0310
CN6204	63349-604-140	CONNECTOR WAFER;53014-0410
CN6208	63053-208-106	LEAD CONNECTOR ASSY;1429 #26 51004-5295 8P 60mm
D6201	62169-406-482	DIODE;1N4148 SAMSUNG
IC6201	62119-103-712	IC;TC4021BP
Q6201	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
R6201	61048-177-224	R-METAL FILM;RM 1/8TS 220K-J
R6202	61048-177-124	R-METAL FILM;RM 1/8TS 120K-J
R6203	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R6204	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J

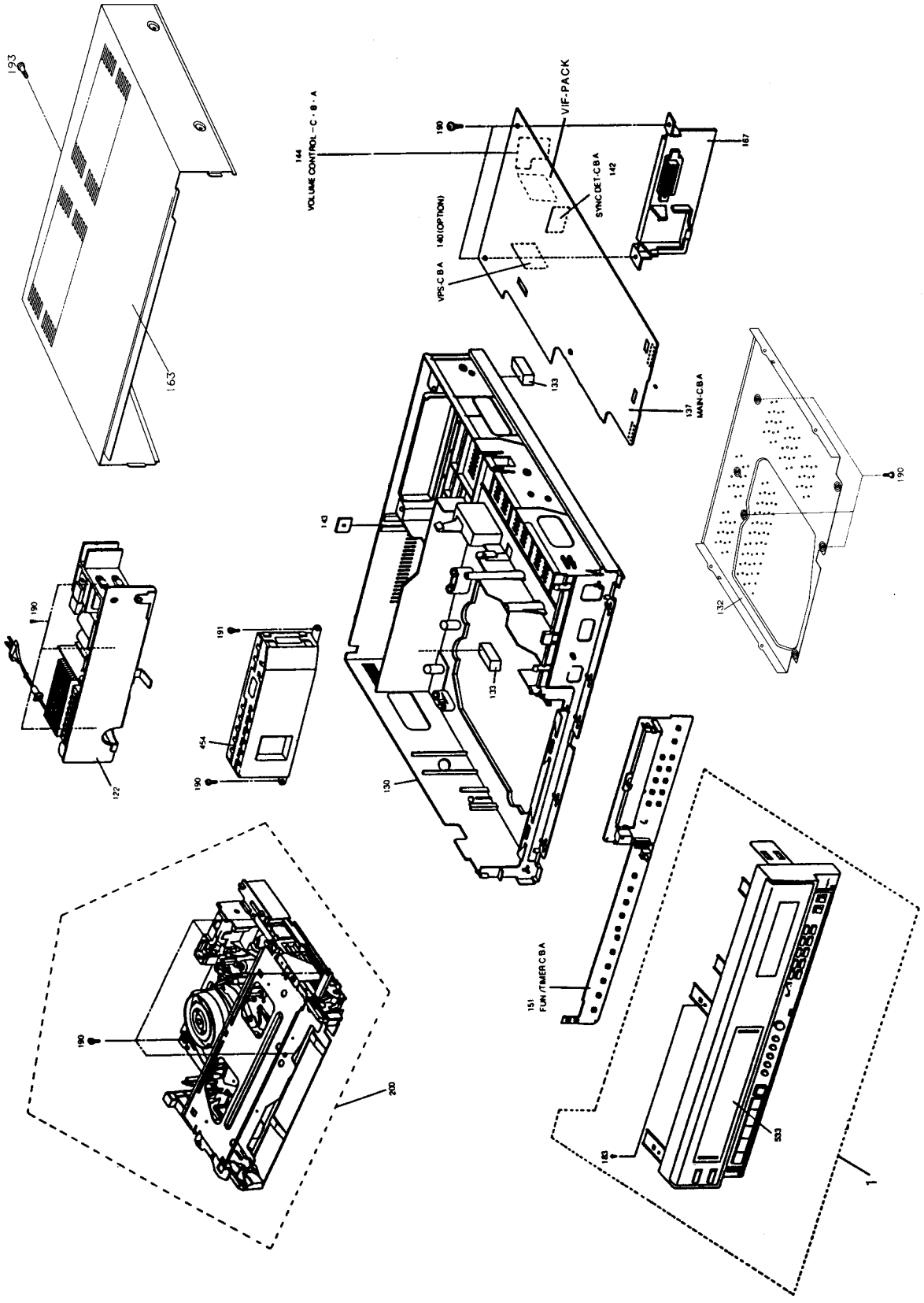
Location - Number	Supplier Parts-Number	Description & Specification
R6205	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R6206	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R6207	61048-177-474	R-METAL FILM;RM 1/8TS 470K-J
R6208	61048-177-224	R-METAL FILM;RM 1/8TS 220K-J
R6209	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R6210	61048-177-391	R-METAL FILM;RM 1/8TS 390-J
R6212	61048-177-224	R-METAL FILM;RM 1/8TS 220K-J
	A S S Y - P W B	V O L U M E C O N T R O L
	69056-603-204	ASSY VOLUME CTL;X-1 PAL MVR-4500P
PWB(S.N.A)	63005-701-495	PWB VOLUME CONTROL ; 94V0 1.6X247X139 MVR-4500P
C4101	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C4102	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C4103	61417-109-210	C-CERAMIC.HK;CK45F TAPG 50V 104-Z
C4104	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
CN4101	63349-120-010	PIN-CONNECTOR(G7);MAIN TO SUB 7PIN
D4101	62169-201-050	DIODE;1N4001 TAPG
D4102	62169-201-050	DIODE;1N4001 TAPG
IC4101	62119-101-770	IC;TC4094BP/CD4094BCN
IC4102	62119-401-279	IC;KDA0800
Q4101	62137-701-013	TRANSISTOR;KSR 1004 TAPG
R4101	61048-277-222	R-METAL FILM;RM 1/4T 2.2K-J
R4102	61048-177-392	R-METAL FILM;RM 1/8TS 3.9K-J
R4103	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R4104	61048-177-622	R-METAL FILM;RM 1/8TS 6.2K-J
R4105	61048-177-622	R-METAL FILM;RM 1/8TS 6.2K-J
ZD4101	62169-423-092	DIODE-ZENER;MTZ 6.8B
ZD4102	62169-403-826	DIODE-ZENER;MTZ 12B
	A S S Y - P W B	R E G U L A T O R
	69098-904-900	REGULATOR ASSY;220V 50HZ MVR-4500P/SEG
PWB(S.N.A)	63005-701-26	PWB-REGULATOR ; 1.6TX191.5X59.5
	63053-811-211	POWER-CORD,ASSY;KLCE-2F CP-2
BD101	62169-403-562	DIODE-STACK;RBV402/D3SBA20
BD102	62169-403-562	DIODE-STACK;RBV402/D3SBA20
C101	61409-601-320	C-CERAMIC;ECK-DNS 472ME
C102	61639-506-332	C-ELEC;CEAP 35V 3300M SG(18X36.5)
C103	61637-205-470	C-ELEC;CEAP 25V 47M SA(6X11)
C104	61639-506-332	C-ELEC;CEAP 35V 3300M SG(18X36.5)
C105	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C106	61639-904-472	C-ELEC;LG-1628-4700-16-M
C107	61607-421-130	C-ELECTROLYTIC;LG-0511-47-16-M TAPG
C108	61637-511-470	C-ELEC;CEAP 100V 47M SG(10X12.5)
C109	61637-511-470	C-ELEC;CEAP 100V 47M SG(10X12.5)
C110	61417-109-210	C-CERAMIC.HK;CK45F TAPG 50V 104-Z
CN100	63053-607-990	LEAD CONNECTOR ASSY;1007 #26 320 RED Q105
CN102	63349-062-590	CONNECTOR-WAFER;5268-10A
D101	62169-406-482	DIODE;1N4148 SAMSUNG
D102	62169-406-482	DIODE;1N4148 SAMSUNG
D103	62169-201-060	DIODE;1N4002 TAPG
D104	62169-201-060	DIODE;1N4002 TAPG
F101	64709-085-130	FUSE;T315mA 250V 218 LF
F102	64709-085-140	FUSE;T2A 250V 218 LF
F103	64709-085-040	FUSE;T1.6A 250V 218 5X20MM LT EUR
IC101	62109-201-282	IC;MC7812
LF101	62429-014-115	LINE-FILTER;HL38
PT101	62869-190-132	POWER-TRANS;EI 66X24 220/240V 50HZ
Q101	62139-301-308	TRANSISTOR;2SD 1944/2SD1273

Location - Number	Supplier Parts-Number	Description & Specification
Q102	62139-301-308	TRANSISTOR;2SD 1944/2SD1273
Q103	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
R101	61049-427-621	R-METAL OXIDE;RS 1P 620-J TAPG
R102	61048-327-271	R-METAL FILM;RS 1/2P 270-J TAPG
R103	61048-327-271	R-METAL FILM;RS 1/2P 270-J TAPG
R104	61048-277-102	R-METAL FILM;RM 1/4T TAPG 1K-J
ZD101	62169-403-302	DIODE-ZENER;MTZ 16A TAPG
ZD102	62169-403-789	DIODE-ZENER;MTZ5.6C TAPG
ZD103	62169-403-829	DIODE-ZENER;MTZ 30D
	A S S Y - P W B S E N S O R	
H553	69000-470-660	PWB SENSOR ASSY;PWB+TR+WIRE
B258	63579-101-027	SW-RECORD;SPPB62029A
B259	66604-633-710	STOPPER P/I;POM
C6202	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C6203	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
CN6204	63053-804-128	LEAD CONNECTOR ASSY;1429 #26 51004-51004 4P 280mm
CN6211	63349-603-040	CONNECTOR-WAFER;53015-0410
Q6202	62309-110-244	PHOTO INTERRUPTER;NJL5165K
Q6203	62309-110-510	PHOTO TR;RPM-20DB
Q6204	62309-110-510	PHOTO TR;RPM-20DB
	A S S Y - P W B P R E A M P	
	36658-601-201	ASSY-PRE AMP;X1 PAL VX-1260
C3101	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3102	61407-101-240	C-CERAMIC.TEMP;CC45 SL TAPG 50V 33-J
C3103	61407-117-101	C-CERAMIC.AXIAL;UP050F 104Z
C3104	61407-101-240	C-CERAMIC.TEMP;CC45 SL TAPG 50V 33-J
C3105	61407-117-101	C-CERAMIC.AXIAL;UP050F 104Z
C3106	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3107	61617-408-010	C-ELEC;CEAP 50V 1M RSS(4X7)
C3108	61507-121-511	C-POLYESTER;CQ921M TAPG 100V 223-J
C3109	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3110	61617-404-470	C-ELEC;CEAP 16V 47M RSS(6.3X7)
C3111	61417-109-200	C-CERAMIC.HK;CK45F TAPG 50V 473-Z
C3112	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3115	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3116	61417-104-282	C-CERAMIC.HK;CK45B TAPG 50V 102-K
C3117	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3118	61407-101-730	C-CERAMIC.TEMP;CC45 SL TAPG 50V 150-K
C3119	61407-101-470	C-CERAMIC.TEMP;CC45 SL TAPG 50V 300-J
C3120	61407-101-121	C-CERAMIC.TEMP;CC45 SL TAPG 50V 10-D
C3121	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3122	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3123	61617-404-470	C-ELEC;CEAP 16V 47M RSS(6.3X7)
C3124	61407-101-290	C-CERAMIC.TEMP;CC45 SL TAPG 50V 56-J
C3125	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3127	61407-101-200	C-CERAMIC.TEMP;CC45 SL TAPG 50V 22-J
C3128	61407-101-420	C-CERAMIC.TEMP;CC45 SL TAPG 50V 180-J
C3129	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3130	61417-109-200	C-CERAMIC.HK;CK45F TAPG 50V 473-Z
C3131	61507-121-450	C-POLYESTER;CQ921M TAPG 50V 682-K
C3132	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3133	61407-105-360	C-CERAMIC.TEMP;CC45 CH TAPG 50V 43-J
C3134	61617-404-470	C-ELEC;CEAP 16V 47M RSS(6.3X7)
C3135	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
C3136	61407-117-228	C-CERAMIC.AXIAL;CAX SL TAPG 50V 223-Z
D3101	62169-406-482	DIODE;1N4148 SAMSUNG
L3102	62427-812-470	COIL-PEAKING;EL0606RA 47uH-J
L3103	62427-812-270	COIL-PEAKING;EL0606RA 27uH-J

Location - Number	Supplier Parts-Number	Description & Specification
L3104	62427-812-390	COIL-PEAKING;ELO606RA 39uH-J
L3105	62427-812-220	COIL-PEAKING;ELO606RA 22uH-J
L3106	62427-812-221	COIL-PEAKING;ELO606RA 220uH-J
L3107	62429-833-101	COIL-PEAKING AXIAL;BALO4ST 101K
L3108	62429-833-101	COIL-PEAKING AXIAL;BALO4ST 101K
L3109	62429-833-101	COIL-PEAKING AXIAL;BALO4ST 101K
L3110	62427-812-390	COIL-PEAKING;ELO606RA 39uH-J
Q3101	62137-103-380	TRANSISTOR;KSA 733-Y TAPG
Q3102	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3103	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3104	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
R3101	61048-177-821	R-METAL FILM;RM 1/8TS 820-J
R3102	61048-177-479	R-METAL FILM;RM 1/8TS 4.7-J
R3103	61048-177-821	R-METAL FILM;RM 1/8TS 820-J
R3104	61048-177-220	R-METAL FILM;RM 1/8TS 22-J
R3105	61048-177-221	R-METAL FILM;RM 1/8TS 220-J
R3106	61048-177-181	R-METAL FILM;RM 1/8TS 180-J
R3107	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3108	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R3109	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R3110	61048-177-391	R-METAL FILM;RM 1/8TS 390-J
R3111	61048-177-391	R-METAL FILM;RM 1/8TS 390-J
R3112	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3113	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R3114	61048-177-222	R-METAL FILM;RM 1/8TS 2.2K-J
R3115	61048-177-272	R-METAL FILM;RM 1/8TS 2.7K-J
R3116	61048-177-821	R-METAL FILM;RM 1/8TS 820-J
R3117	61048-177-471	R-METAL FILM;RM 1/8TS 470-J
R3119	61048-177-102	R-METAL FILM;RM 1/8TS 1K-J
R3120	61048-177-564	R-METAL FILM;RM 1/8TS 560K-J
R3121	61048-177-393	R-METAL FILM;RM 1/8TS 39K-J
R3122	61048-177-181	R-METAL FILM;RM 1/8TS 180-J
R3123	61048-177-562	R-METAL FILM;RM 1/8TS 5.6K-J
R3124	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R3125	61048-177-183	R-METAL FILM;RM 1/8TS 18K-J
	A S S Y - S Y N C D E T	
	69056-601-204	ASSY-SYNC DET
C3601	61637-206-100	C-ELEC;CEAP 35V 10M SA(5X11)
C3602	61637-208-010	C-ELEC;CEAP 50V 1M SA(5X11)
CN3601	63349-120-010	PIN-CONNECTOR(G7);MAIN TO SUB 7PIN
D3601	62169-406-482	DIODE;1N4148 SAMSUNG
Q3601	62137-302-740	TRANSISTOR;KSC 945-Y TAPG
Q3602	62137-701-013	TRANSISTOR;KSR 1004 TAPG
Q3603	62137-701-013	TRANSISTOR;KSR 1004 TAPG
Q3604	62137-701-013	TRANSISTOR;KSR 1004 TAPG
R3601	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R3602	61048-177-821	R-METAL FILM;RM 1/8TS 820-J
R3603	61048-177-470	R-METAL FILM;RM 1/8TS 47-J
R3604	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R3605	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J
R3606	61048-177-472	R-METAL FILM;RM 1/8TS 4.7K-J

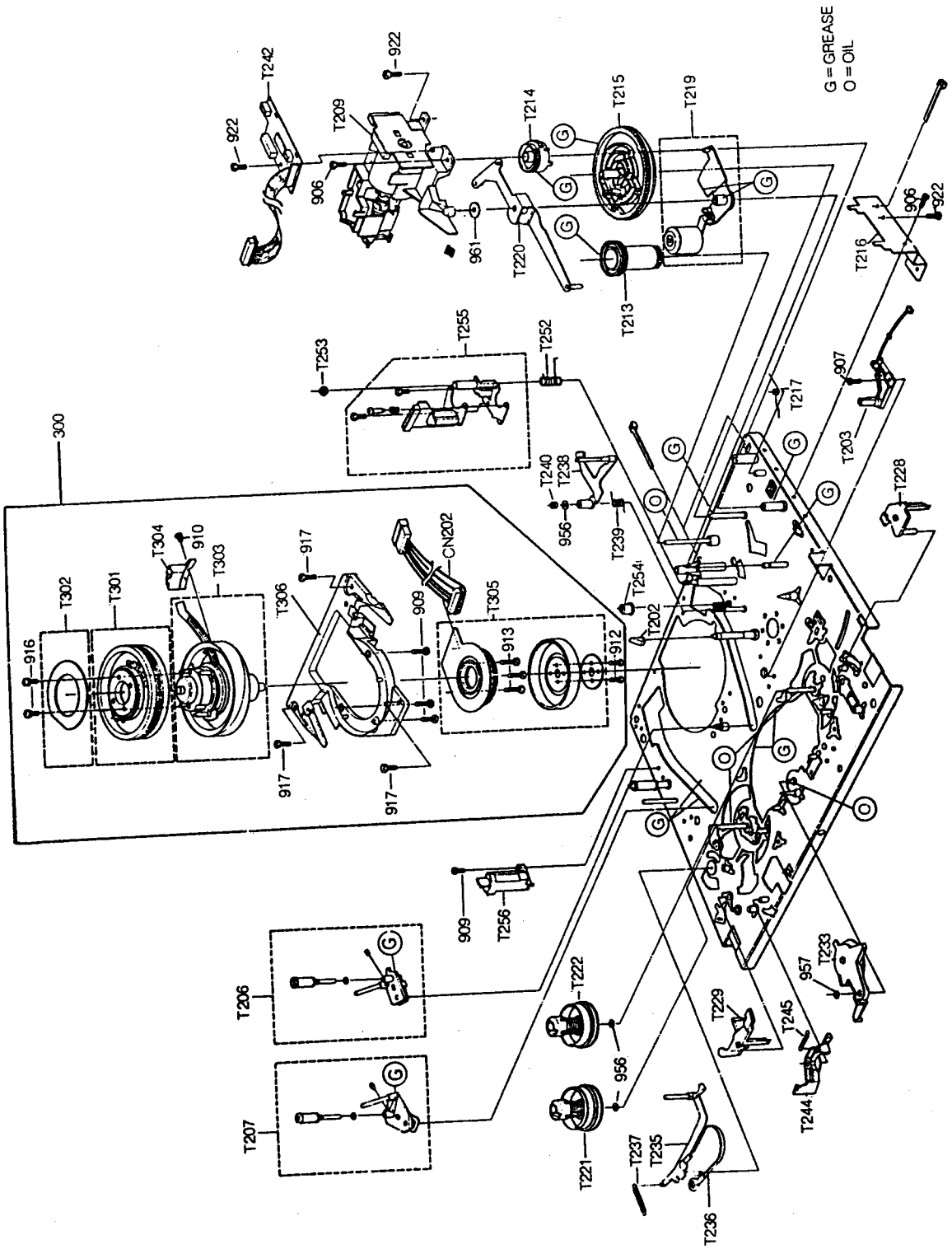
7. MECHNICAL EXPLODED VIEWS

7-1. Instrument Assembly



LOCA NO	PART-NUMBER	DESCRIPTION,SPECIFICATION
1	69000-183-103	ASSY PANEL FRONT;MVR-4500P HAPSUNG
122	69098-904-900	REGULATOR ASSY;220V 50HZ MVR-4500P/SEG
130	66020-602-310	FRAME;HIPS 94HB
132	66612-604-710	BOTTOM COVER;SPG T0.5
133	66074-601-410	LEG;VT-1260 TPE(BLK)7705
137		ASSY MAIN;X-1 PAL MVCR MVR-4500P
142	69056-601-204	ASSY SYNC DET;X1 PAL VX-1561(4H'D)
143	66614-714-310	BRKT-GUIDE TOP S;SPG T1.0
144	69056-603-204	ASSY VOLUME CTL;X-1 PAL MVR-4500P
151	69171-302-221	ASSY F/TIMER;X-1 PAL MVCR NO VPS
163	66002-603-510	TOP CABINET;HISH T0.85 BLK
167	66462-607-010	CONNECTOR BOARD;HIPS 94HB
183	67154-101-440	SCREW-TAP.PWH;2-3X10 FE FZY
190	67158-240-121	SCREW BH;2-4X12 FE FTY
191	67108-330-061	SCREW-PH;M3X6 TAP TITE
193	67158-240-103	SCREW TAP BH;2S-4X10 FE FZB
200	DX1-PR1	FULL DECK ASSY;X-1
454	69958-601-201	ASSY PRE AMP;X1 PAL(2H'D)
533	67642-603-805	DOOR HOUSING;ACRYL HI855M 9027 VX-1260

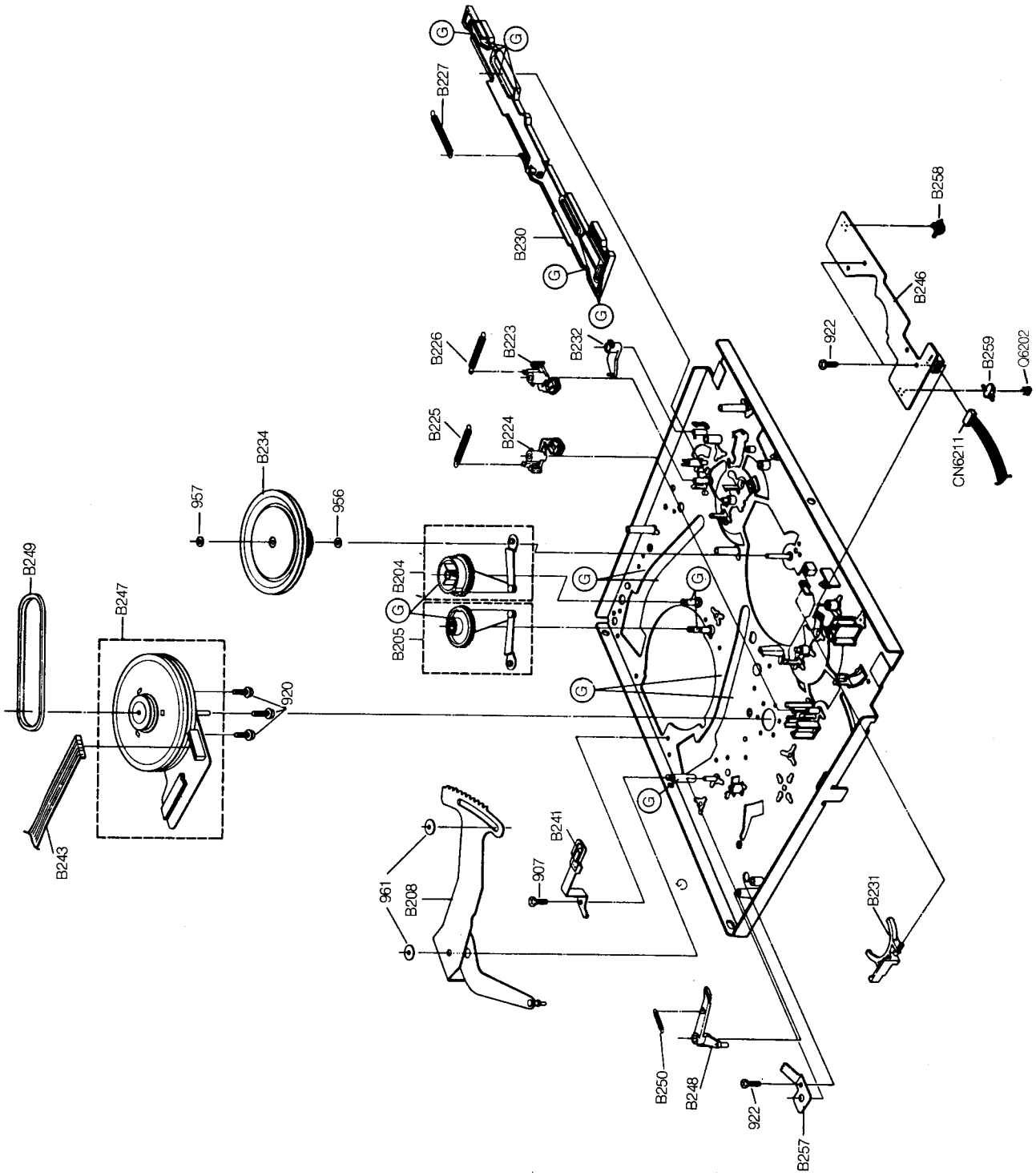
7-2. Transport Mechanism Assembly



TOP

LOCA NO	PART-NUMBER	DESCRIPTION SPECIFICATION
906	67008-130-061	SCREW-PH;+M3X6 FE FZY
907	67004-100-710	SCREW-PH;+M3X4 FE FZY
909	67008-126-081	SCREW-PH;+M2.6X8 FE FZY
910	67008-126-041	SCREW-BH;+M2.6X5 FE FZY
912	67094-604-710	SCREW-DAMPER;M2.0X7.0 SWCM 10(MFZN2-C)
913	67008-123-101	SCREW-PH;+M2.3X10 FE FZY
916	67004-126-086	SCREW-BH;+M2.6X8 WSZN/70391398
917	67004-100-310	SCREW-PH;+M3X8 FE FZY WL
922	67108-526-243	SCREW-TAP.PH;2S-3X8 FE FZY
956	67304-103-410	WASHER-PLAIN;3.2X6X0.5 POLYSLIDER
957	67334-600-310	WASHER SLIT;PI2.5XPI5XT0.5
961	67304-602-610	WASHER SLIT;PI3.6XPI12XT0.5 LUMIRROR(RED)
CN202	63053-916-297	LEAD CON ASSY;1429 #26 PHR-06 1L-M-6P-SA 220m/m
T202	65224-606-220	CAP(NO.8 GUIDE);DURACON M90-44
T203	69000-290-220	ASSY LED(R);DX1-NR2
T206	69000-280-247	G/R & P/B ASSY;X-1
T207	69000-280-242	G/R & P/B ASSY;X-1
T209	65292-600-620	LOADING UNIT ASSY;POM+SUS+SECC
T213	65203-604-910	GEAR WORM WHEEL;POM(X-1)
T214	65203-605-010	GEAR E/J DRIVE;PBT(X-1)
T215	65241-600-010	GEAR MASTER CAM;POM(X-1)
T216	66613-610-720	BRKT E/J DRIVE;SECC T1.2
T217	66674-639-210	S/P EJECT DRIVE;SWPB
T219	65253-611-610	LEVER PINCH ROLLER ASSY;SECC+SUM+NBR+BEARIN
T220	65263-601-030	LEVER BRAKE CAM ASSY;SECC 20/20+SUM
T221	65234-602-610	REEL DISK ASSY;POM+SUS
T222	65234-602-620	REEL DISK ASSY;POM+POLYESTER
T228	65254-626-510	BRAKE SUB ASSY;X-1
T229	66603-612-810	BRAKE SUB;POM
T233	66054-609-410	IDLER SUB ASSY;(X-1)
T235	65253-609-010	ARM TENSION ASSY;SECC+POM+SUS
T236	65274-603-120	TENSION BAND ASSY;POM+FELT+LUMIRROR
T237	66674-640-510	SPRING TENSION;SUS304-WPB
T238	65263-600-820	REVIEW ARM ASSY;SECC 20/20+SUS
T239	66674-639-020	SPRING-REVIEW ARM;SUS304 WPB PI0.55
T240	67224-602-011	NUT NYLON;M3 X 4.5 NYLON 66 + SWR
T242	69000-290-232	ASSY PCB JOINT(R);DX1-NR2
T244	65253-609-310	LEVER REC S/W;POM
T245	66674-641-010	S/P REC S/W;SUS304 WPB
T252	66674-640-920	SPRING-TORSION A/C;SWPB(NI)
T253	67224-602-011	NUT NYLON;M3 X 4.5 NYLON 66 + SWR
T254	67224-602-210	CAM ADJUST;ALLOY 5
T255	69000-290-260	ASSY-A/C HEAD(R);DX1-NR2
T256	64079-700-454	HEAD MAGNETIC F/E;VTR-1X2ERS11-089(X-1)
T300	69019-123-110	CYLINDER ASSY;CX1S2P
T301	69000-390-012	ASSY-UPPER CYLINDER;CX1S2P
T302	63005-701-075	PWB-UPPER CYLINDER;94V0 47X47X1.0T
T303	69000-390-028	ASSY LOWER CYLINDER;CX1S2/SEM
T304	67223-600-110	HOLDER TR ASSY;ZDC+SUS301 CSP T0.2
T305	69000-390-061	SEMI ASSY-MOTOR(U);CX1
T306	66121-601-210	BASE-CYLINDER;ADC 12(X-1)

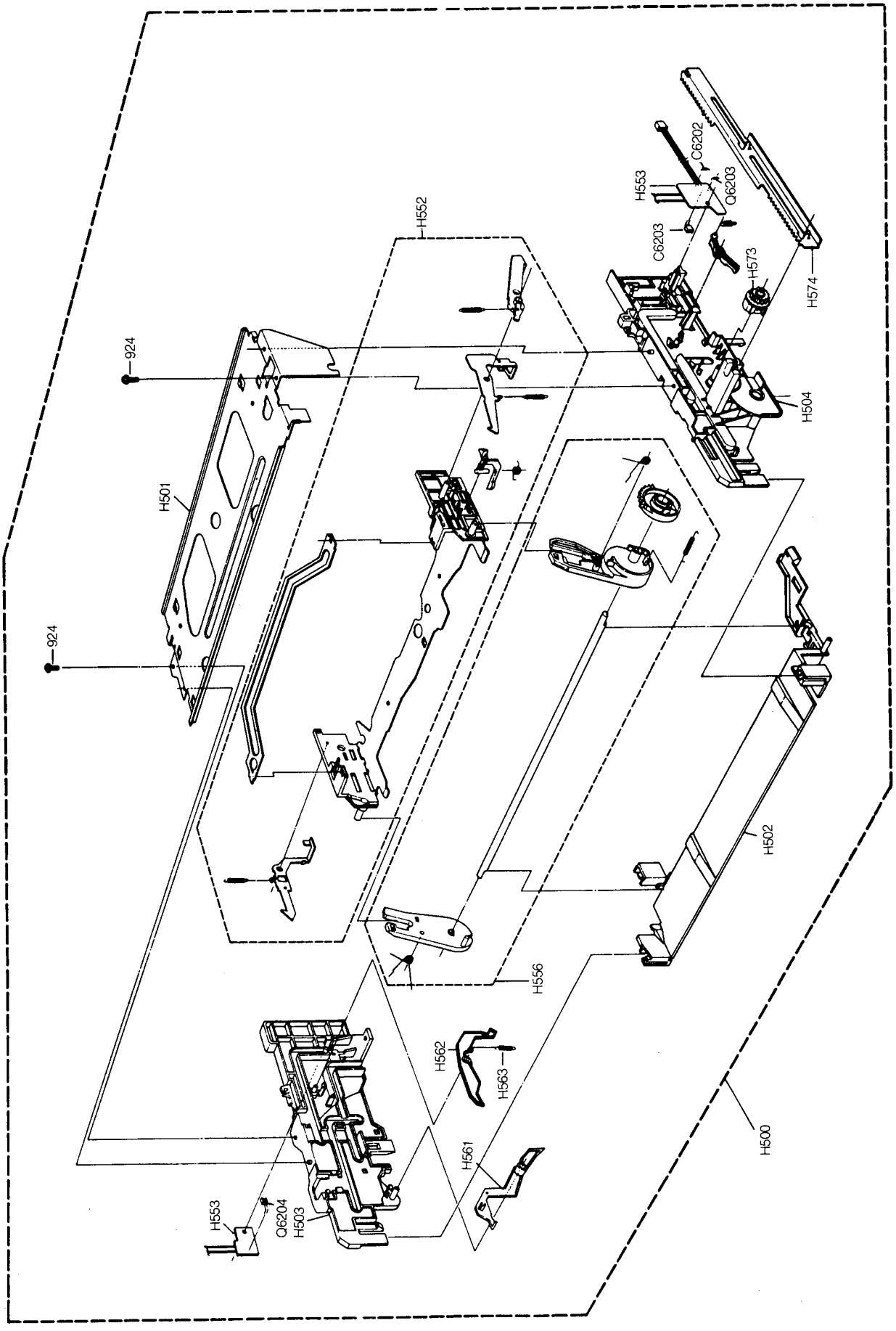
7-3. Bottom Side Mechanism Assembly



BOTTOM

LOCA.NO	PART-NUMBER	DESCRIPTION;SPECIFICATION
907	67004-100-710	SCREW-PH;+M3X4 FE FZY
920	67094-700-760	SCREW-PWH;M2.6X6 FE FZY
922	67108-526-243	SCREW-TAP.PH;2S-3X8 FE FZY
956	67304-103-410	WASHER-PLAIN;3.2X6X0.5 POLYSLIDER
957	67334-600-310	WASHER SLIT;PI2.5XPI5XT0.5
961	67304-602-610	WASHER SLIT;PI3.6XPI12XT0.5 LUMIRROR(RED)
B204	65264-606-510	GEAR LOADING ASSY;X-1
B205	65264-606-610	GEAR LOADING ASSY;X-1
B208	65263-601-110	GEAR SECTOR ASSY;SECC+SUM
B223	65254-626-210	BRAKE MAIN ASSY;X-1
B224	65254-626-310	BRAKE MAIN ASSY;X-1
B225	66674-640-710	S/P SUB ;SWPB(BLK)
B226	66674-640-810	S/P SUB ;SUS304 WPB
B227	66674-642-710	S/P MAIN SLIDE;SWPB(YEL)
B230	65252-600-910	SLIDE MAIN BRAKE ASSY;PBT+SUS
B231	65253-609-210	LEVER SHIFT;POM
B232	65294-602-310	LEVER TENSION CONTROL;PBT
B234	66053-604-411	CLUTCH ASSY;POM+SUS+WOL
B241	66614-625-010	HEAD BRUSH ASSY;SECC T1.0+CARBON TIP
B243	63054-309-110	FLAT CABLE;P1.25 9P 180m/m
B246	69000-290-240	ASSY-REEL PCB(R);DX1-NR2
B247	64769-052-253	MOTOR D.D CAPSTAN;F2QKB89(X-1)
B248	65254-626-020	DD BRAKE ASSY;PBT+FELT
B249	65274-603-210	BELT CAPSTAN;CY65(X-1)
B250	66674-638-820	S/P D.D CAPSTAN;SUS 304(X-1)
B257	66674-646-910	GROUND PALTE BOTTOM;SUS430 T0.3
B258	63579-101-027	SW-RECORD;SPPB62029A
B259	66604-633-710	STOPPER P/I;POM
CN6204	63053-804-128	LEAD CONNECTOR ASSY;1429 #26 51004-51004 4P 280mm
Q6202	62309-110-244	PHOTO INTERRUPTER;NJL5165K

7-4. Housing Assembly

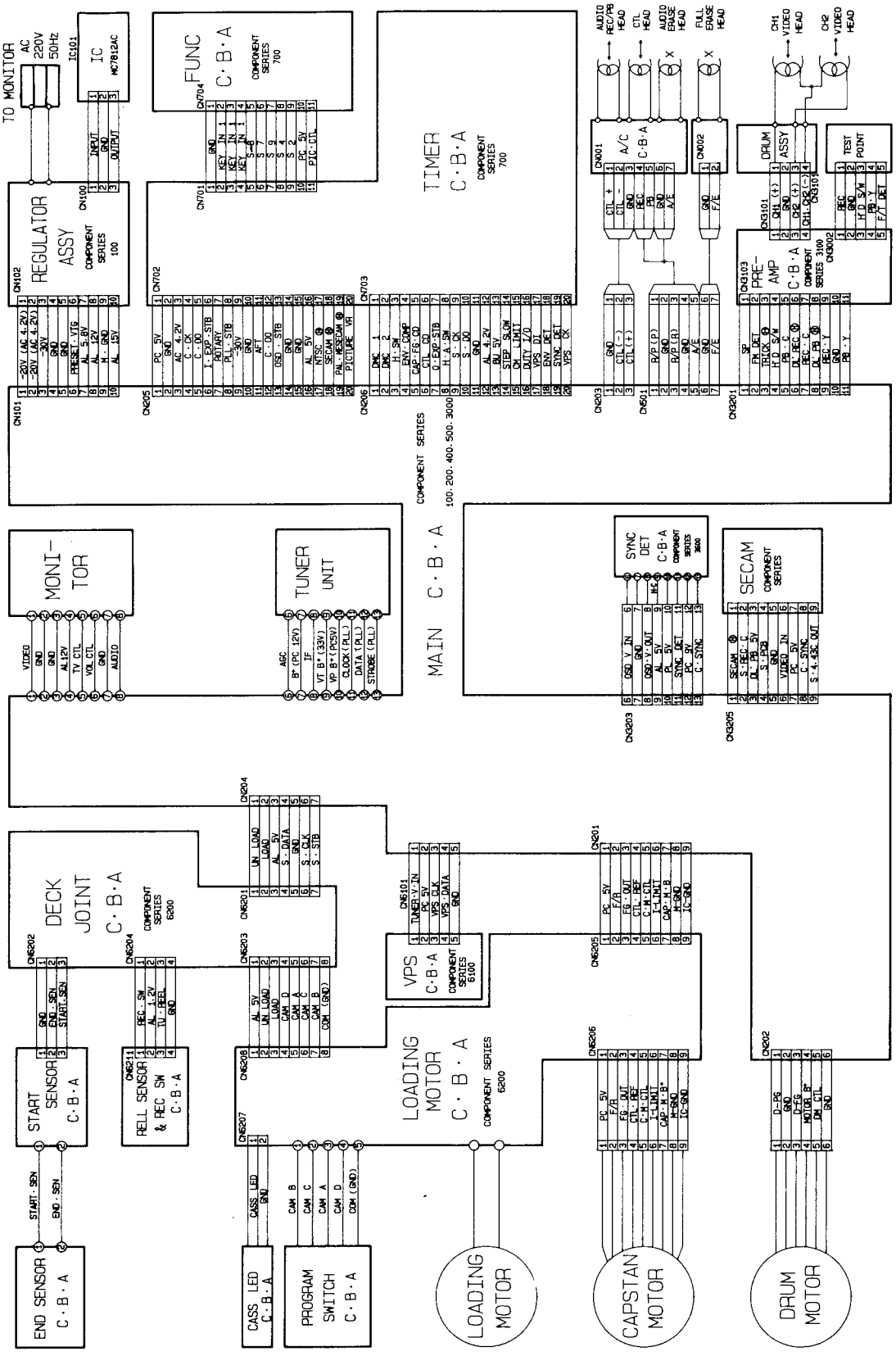


HOUSING

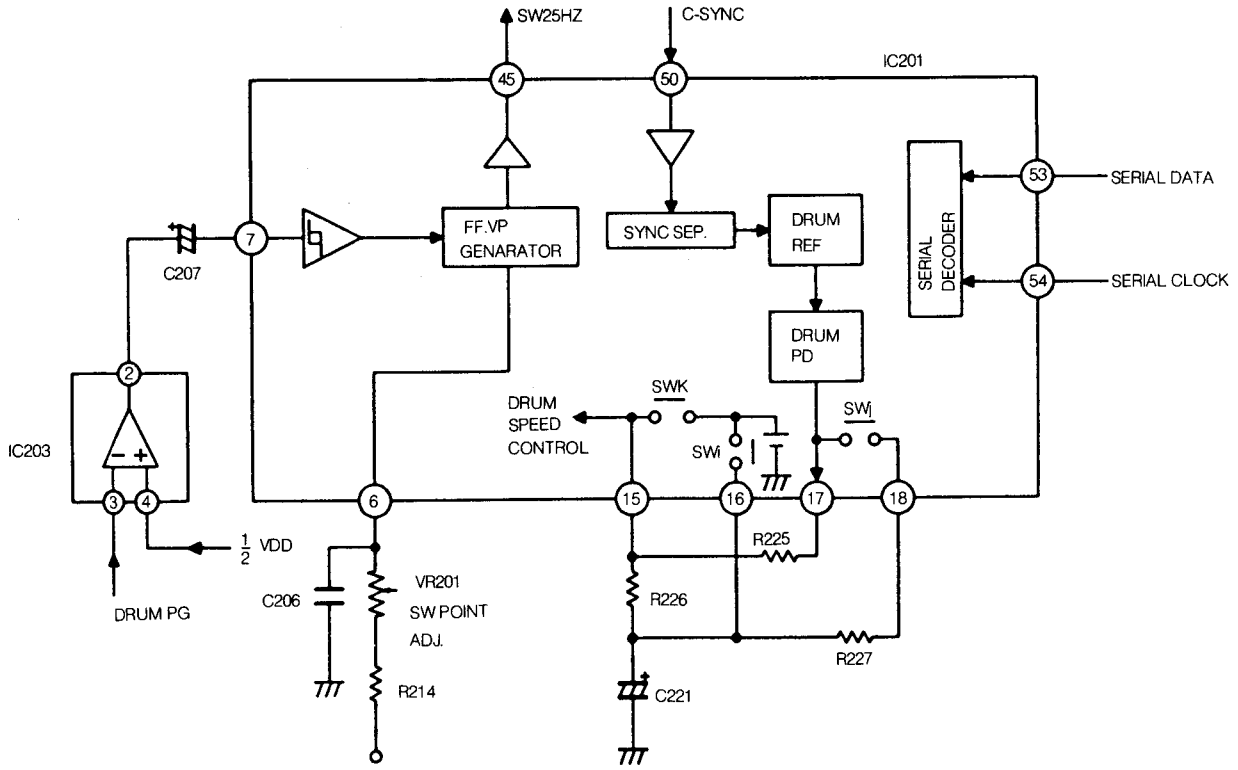
LOCA.NO	PART-NUMBER	DESCRIPTION,SPECIFICATION
H500	66122-700-660	F/L HOUSING ASSY;X-1
H501	66151-602-210	UPPER CHASSIS;SECC 20/20 T=1.0**
H502	66461-600-120	GUIDE CASSETTE;ABS(GP-2200)BLK
H503	69000-470-610	SIDE CHASSIS(L) ASSY;ABS+POM
H504	69000-470-690	SIDE CHASSIS ASSY;ABS+POM+SECC
H552	69000-470-620	ASSY CASS HOLDER;SECC+POM+SUS
H553	69000-470-660	PWB SENSOR ASSY;PWB+TR+WIRE
H556	69000-470-650	ASSY-SIDE ARM;SUM+POM+DURCON
H561	65253-608-510	MASK CAM LEVER;POM(M90-44)NAT
H562	65204-613-510	LIGHT SHUTTER;POM(M90-44)BLK
H563	66674-639-820	S/P LIGHT SHUTIER;SUS 304 WPB
H573	65203-605-330	JOINT GEAR;DIE CASTING(ZDC-2)
H574	65253-605-310	EJECT SLIDE;SECC 20/20 T=1.6
924	67154-101-420	SCREW-TAP PWH;2S-3X8 FE FZY
C6202	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
C6203	61407-117-104	C-CERAMIC.AXIAL;CAX Y TAPG 16V 0.01-N
Q6203	62309-110-510	PHOTO TR;RPM-20DB
Q6204	62309-110-510	PHOTO TR;RPM-20DB

8. BLOCK DIAGRAM

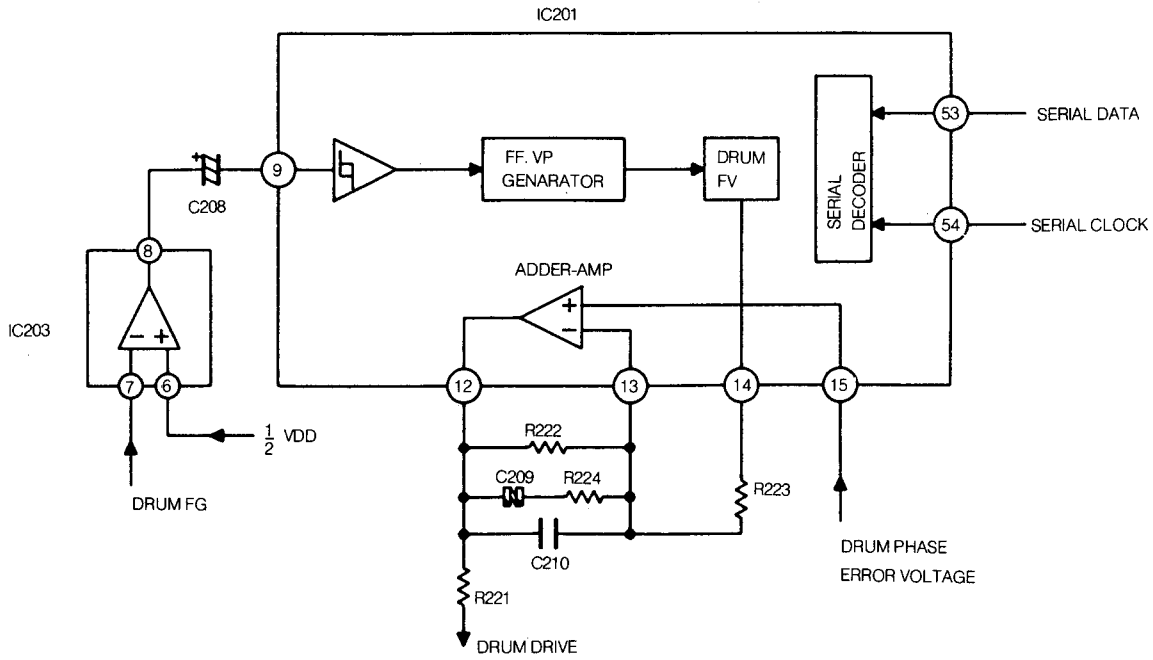
8-1. Total Wiring Diagram



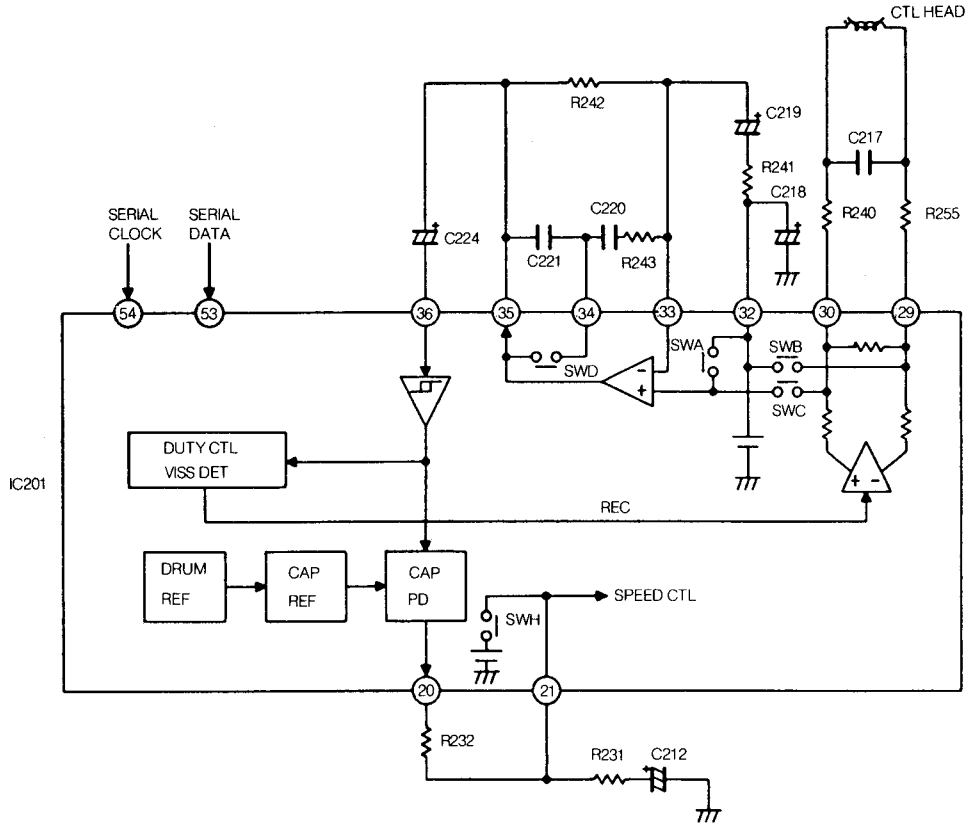
8-2. Drum Phase Control



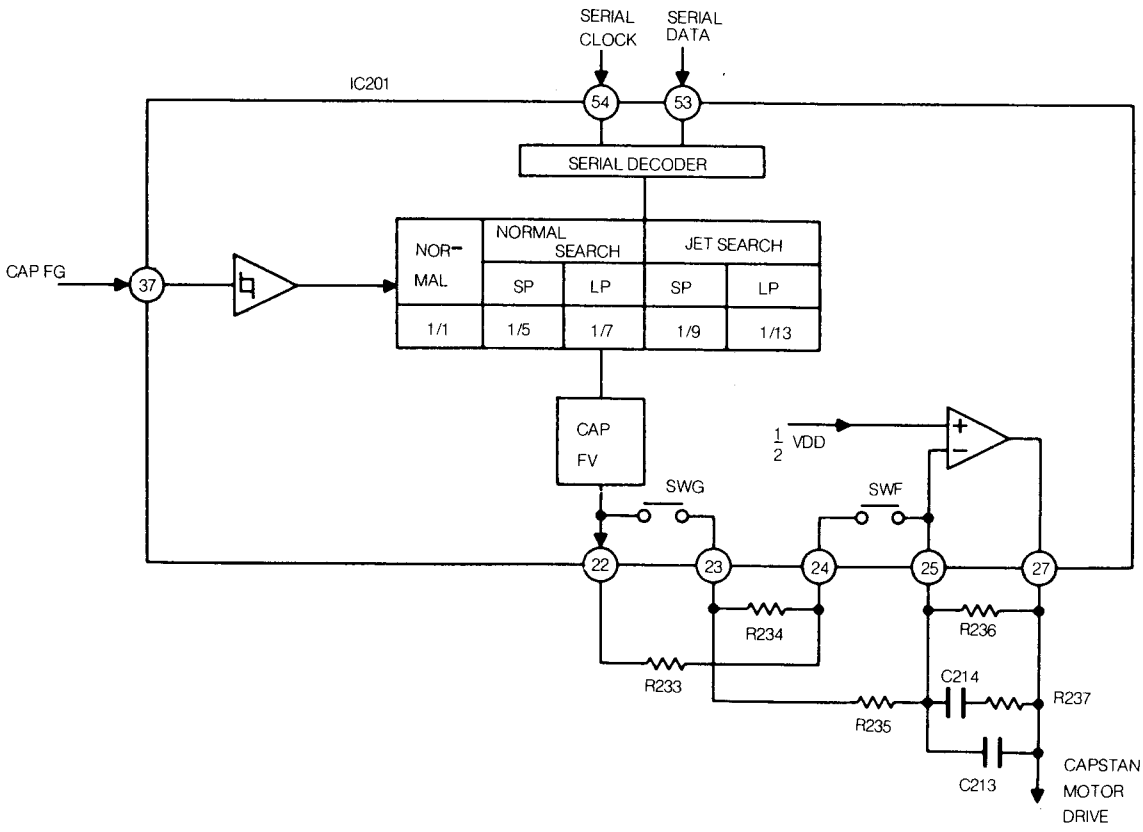
8-3. Drum Speed Control



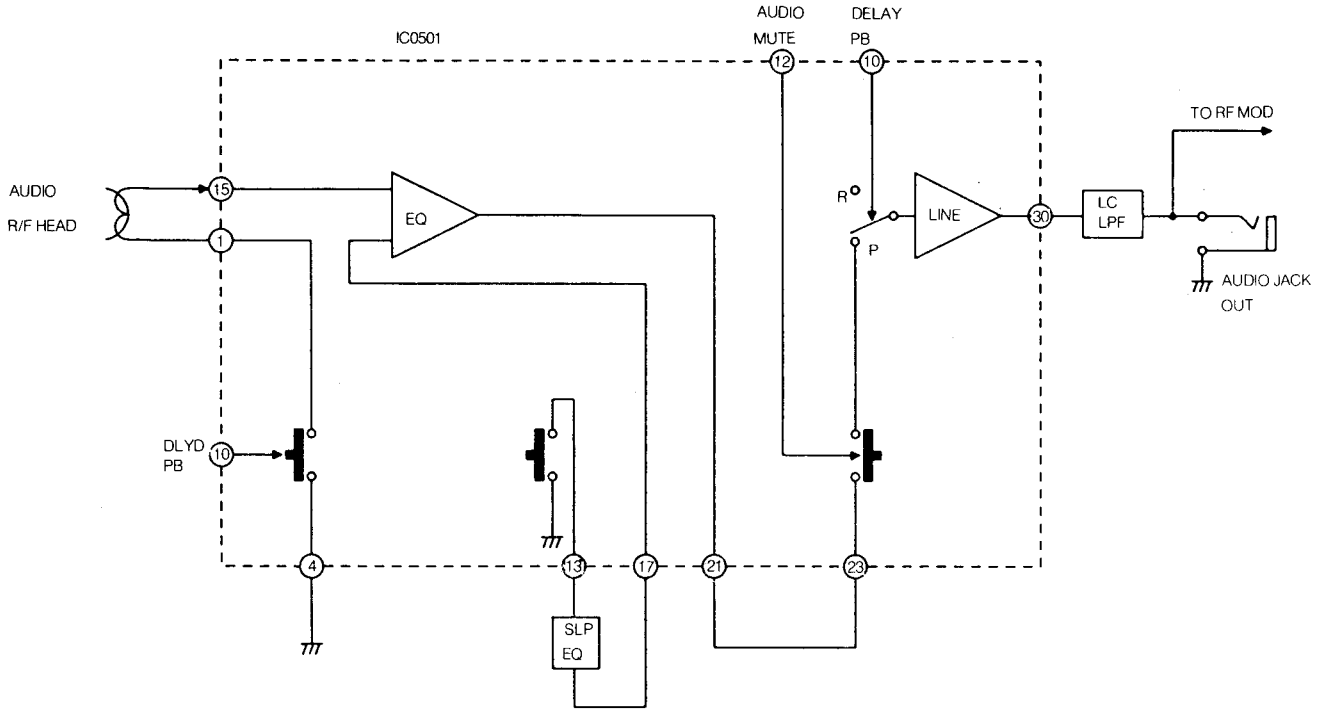
8-4. Capstan Phase Control



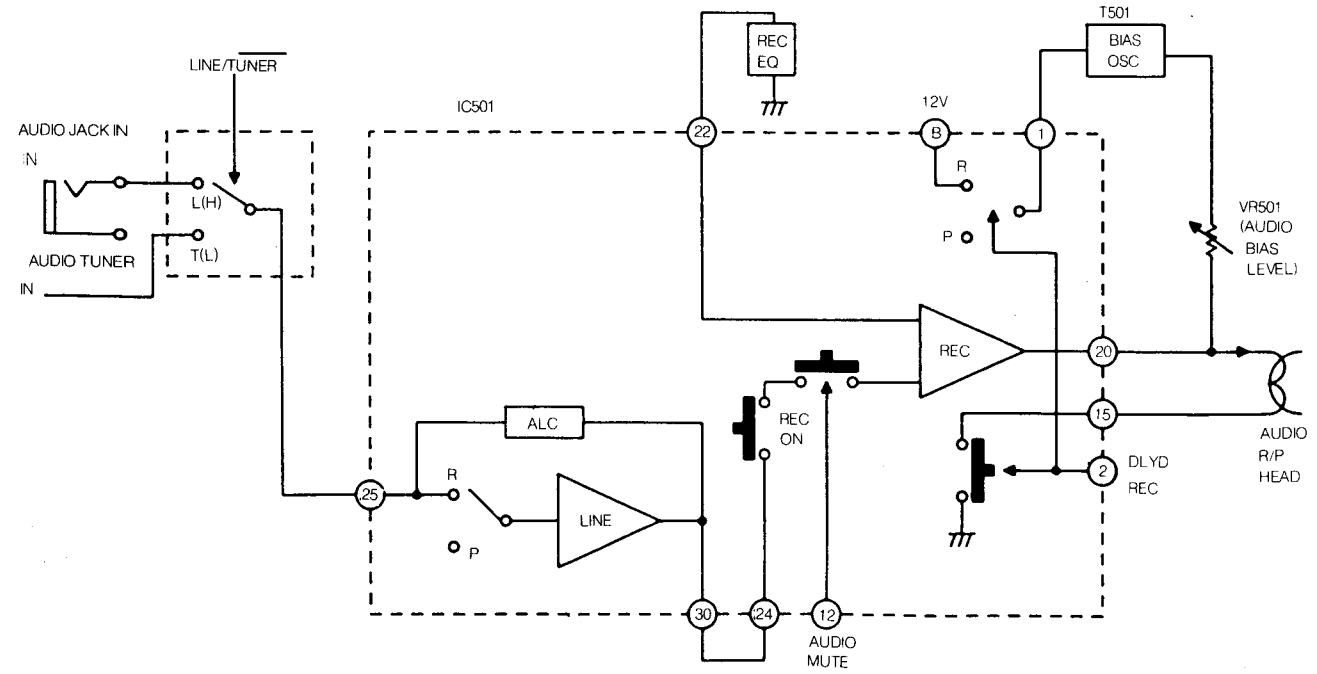
8-5. Capstan Speed Control



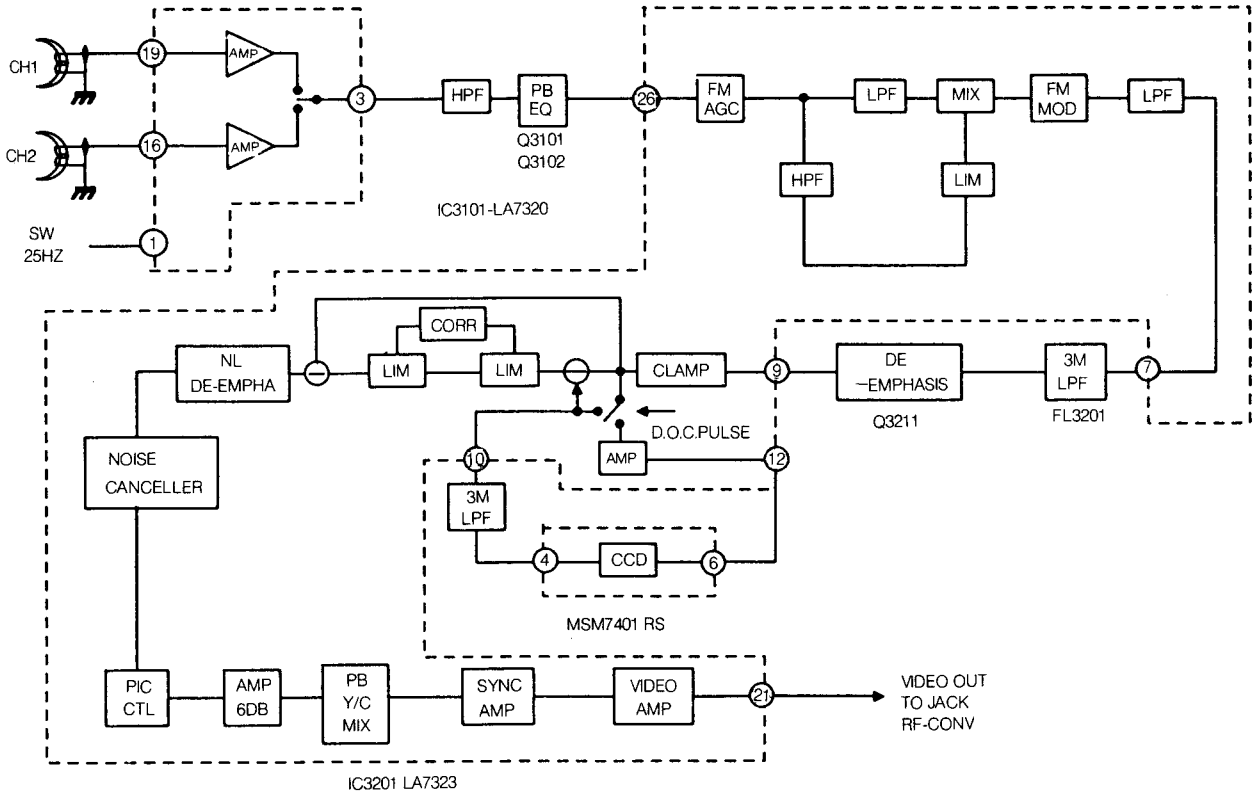
8-6. Audio Playback Process



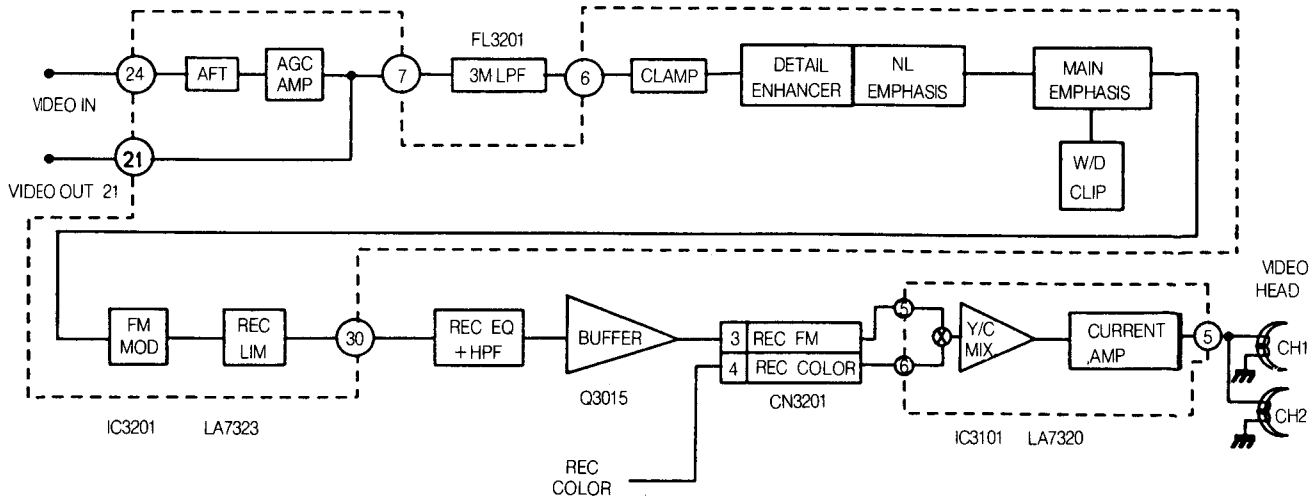
8-7. Audio Record Process



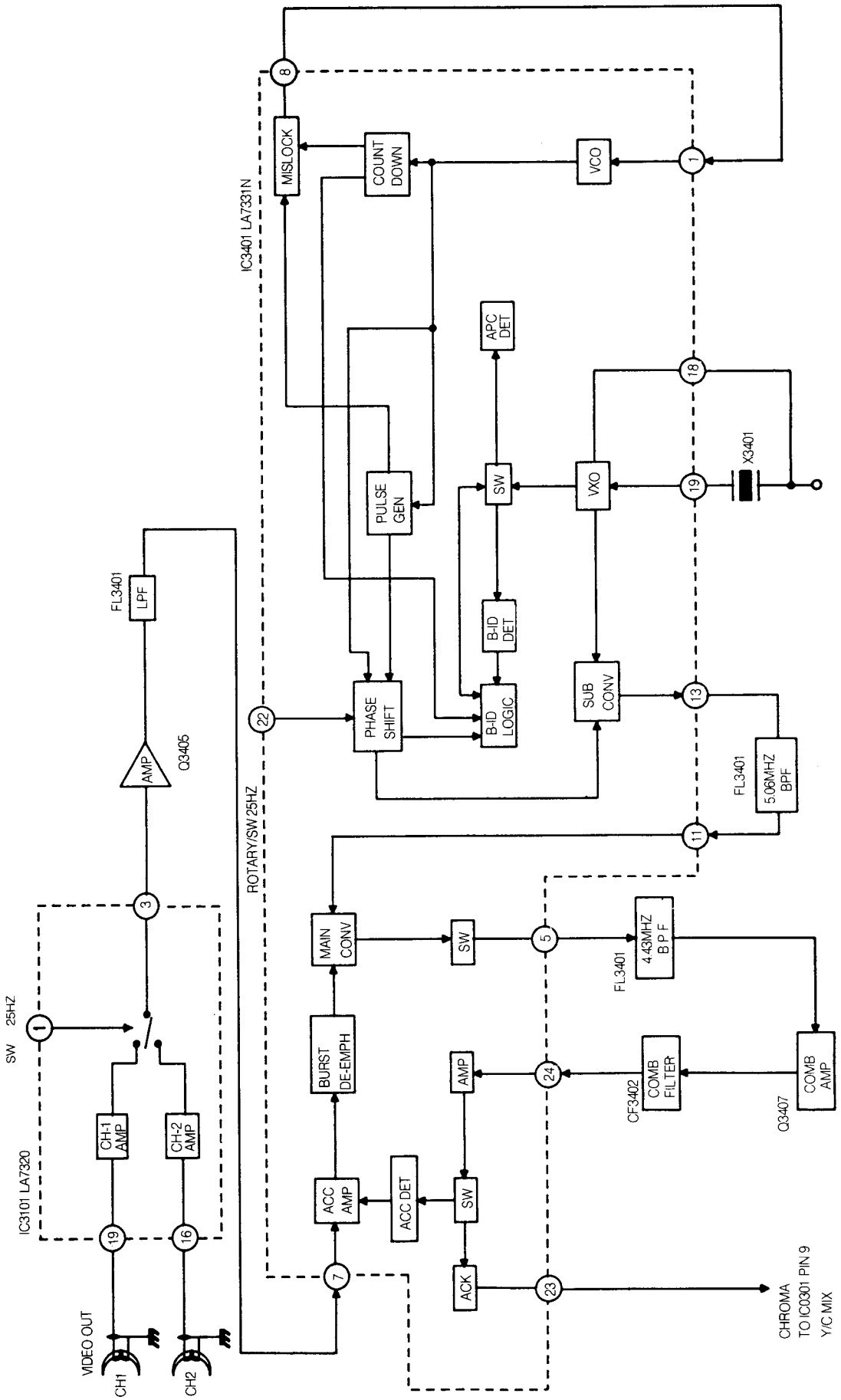
8-8. Luminance Playback Process



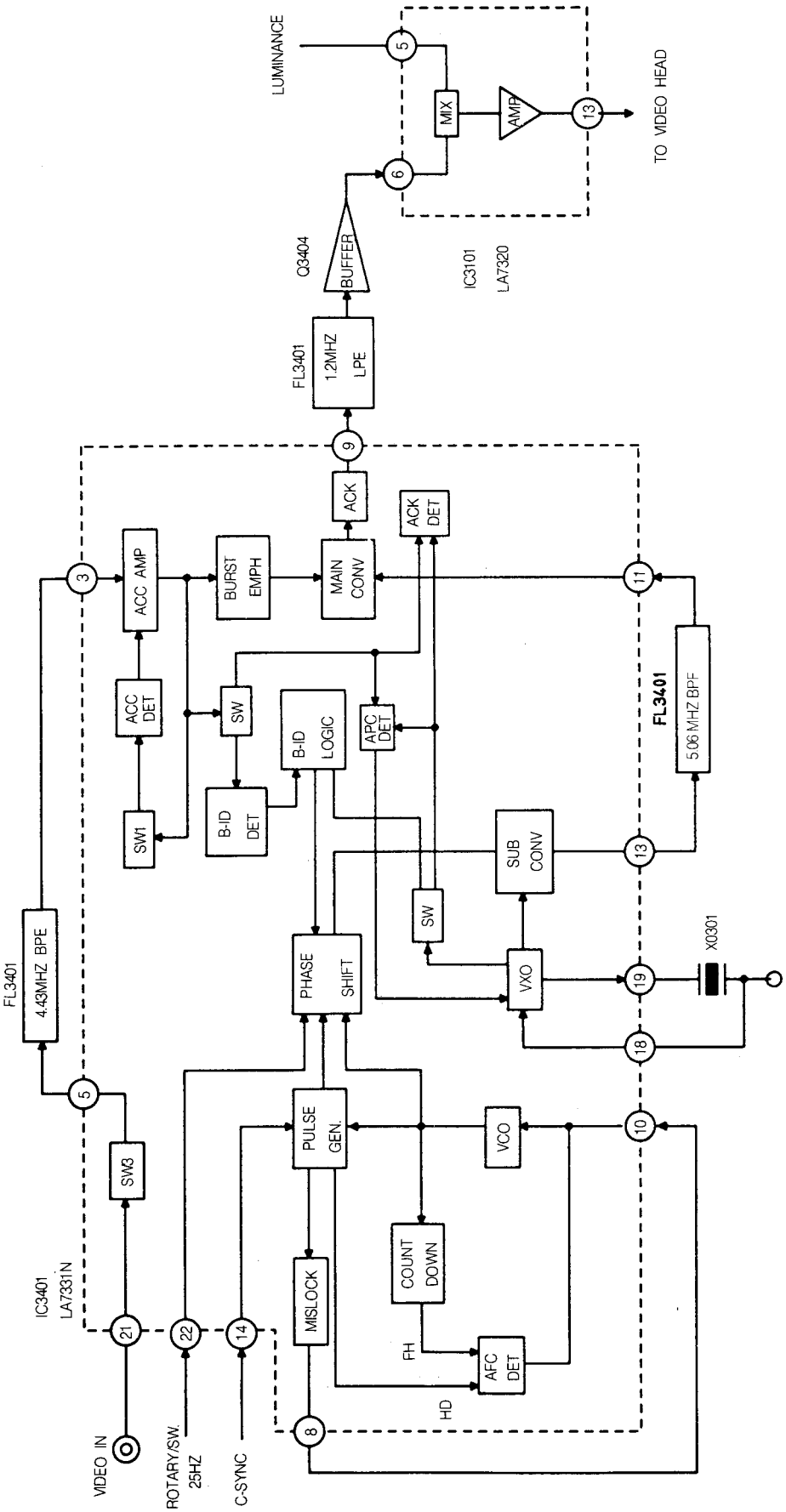
8-9. Luminance Record Process



8-10. Chrominance Playback Process

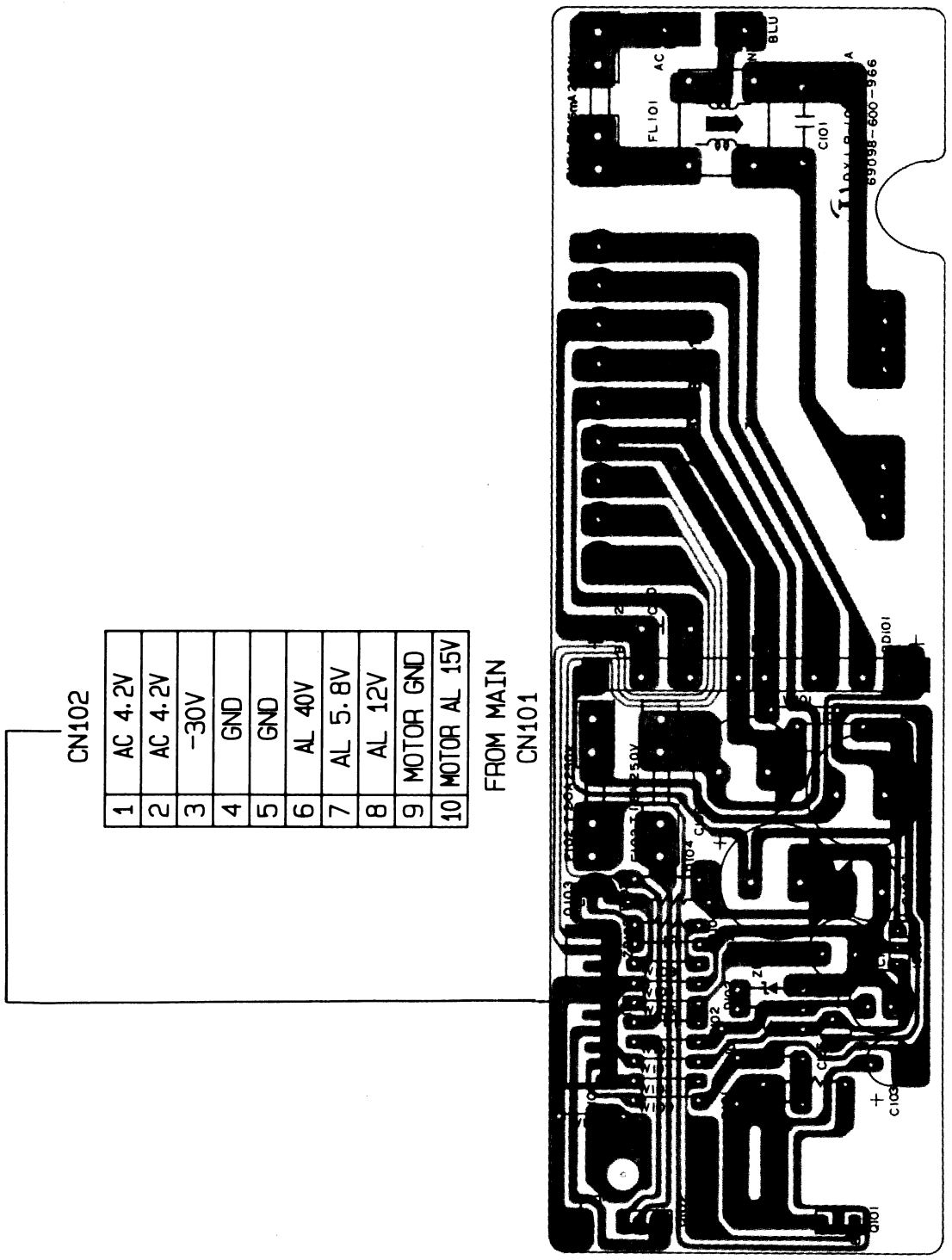


8-11. Chrominance Record Process

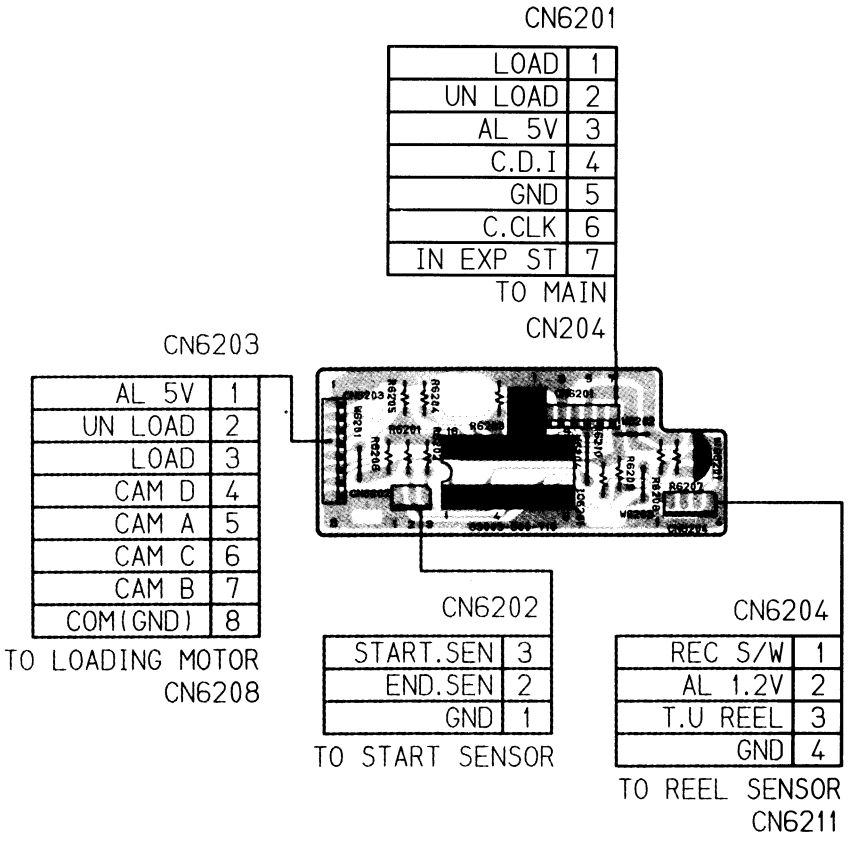


9. CIRCUIT BOARDS

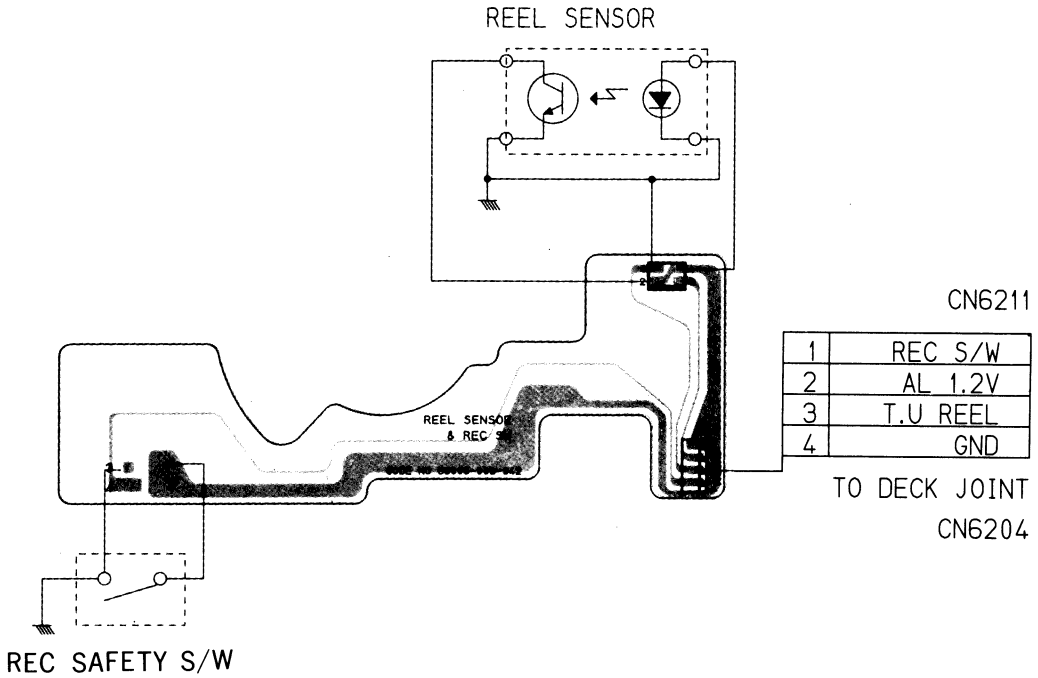
9-1. Regulator



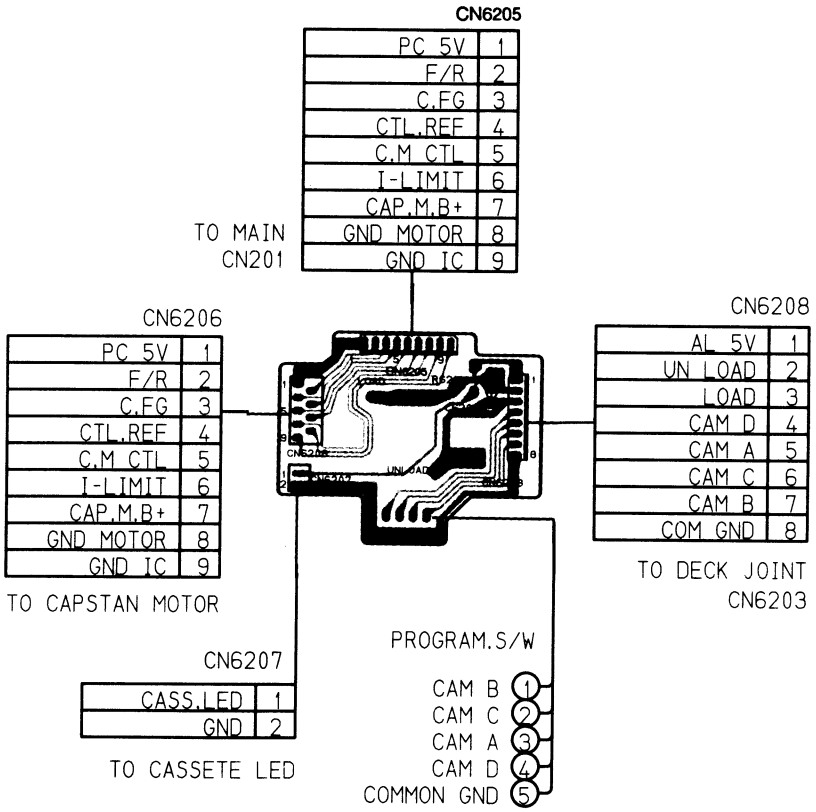
9-2. Deck Joint



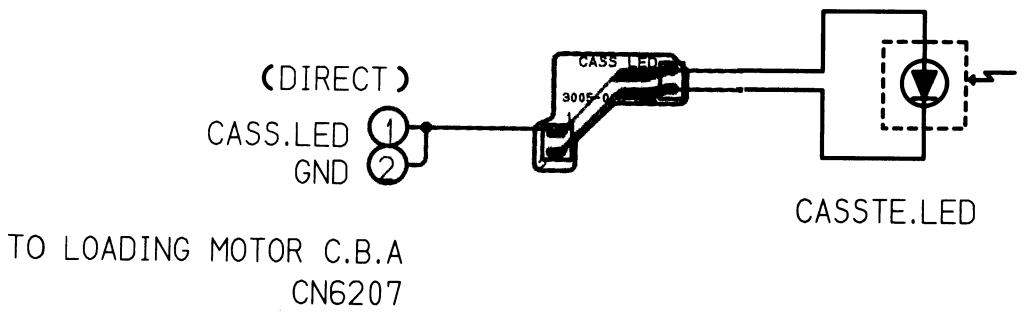
9-3. Reel Sensor



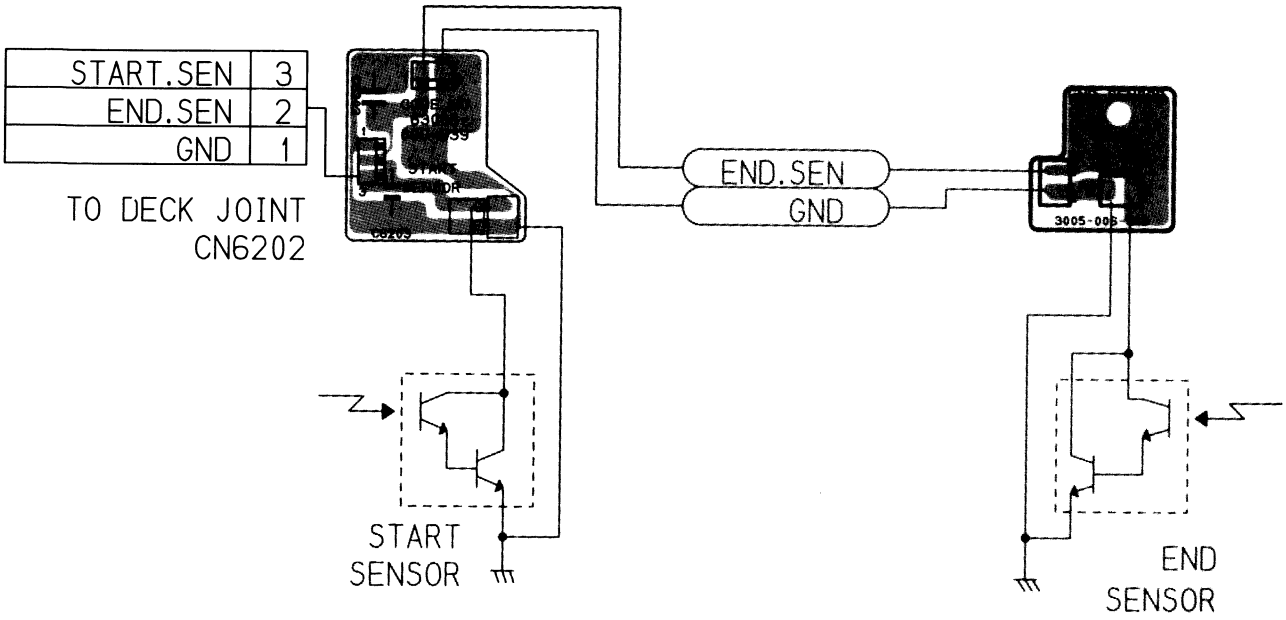
9-4. Loading Motor



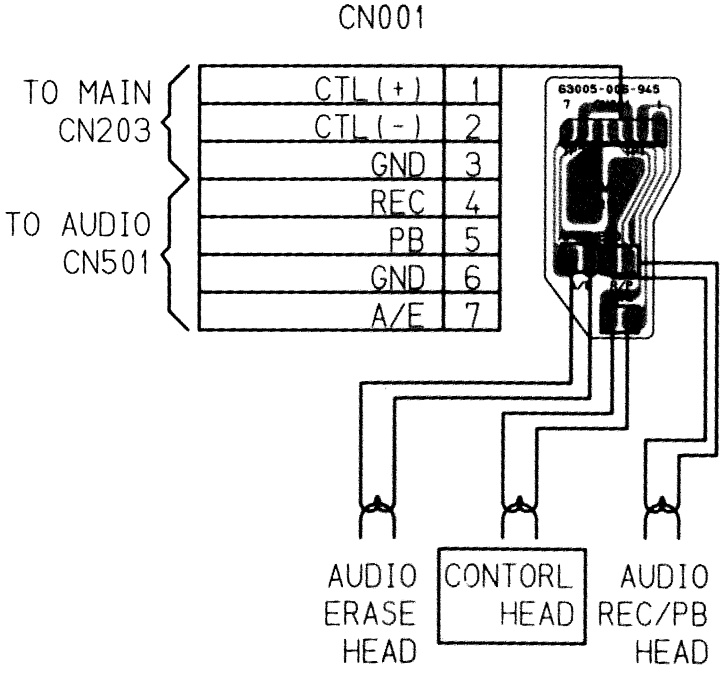
9-5. Cassetle LED



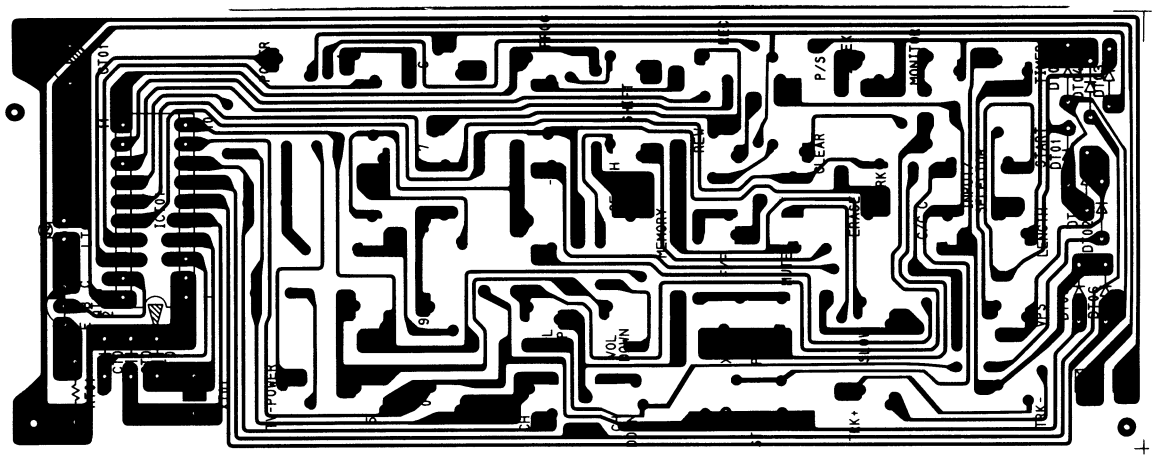
9-6. Start/End Sensor



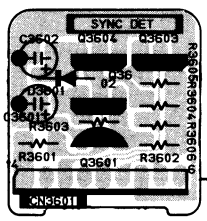
9-7. A/C Head



9-8. Remote Control



9-9. Sync DET



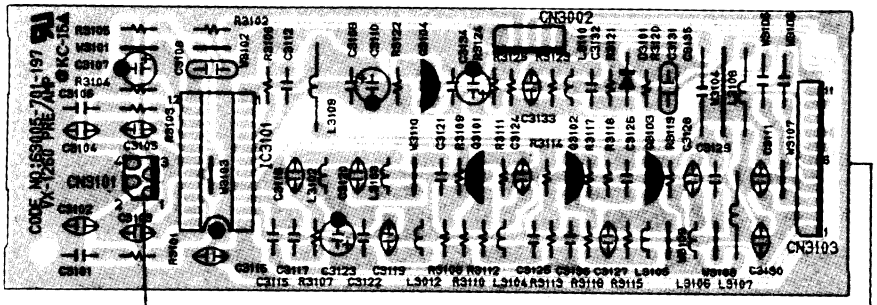
NON OSD PCB

6	OSD ST
7	OSD. V. OUT
8	GND
9	OSD. V. IN
10	AL 5V
11	PC 5V
12	SYNC DET Ⓛ
13	PC 12V
14	C. SYNC

FROM MAIN
CN3203

9-11

9-10. Pre – Amp



CN3101

1	CH1 (+)
2	GND
3	CH2 (+)
4	CH1. CH2 (−)

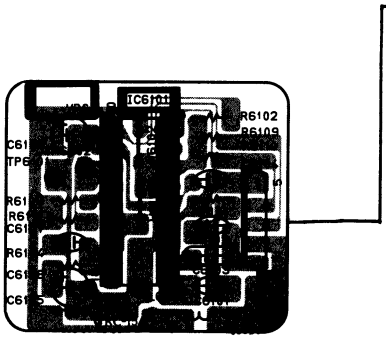
FROM
DRUM ASSY
CN3101

CN3103

1	PB FM
2	GND
3	REC FM
4	DL PB 5V
5	REC C
6	DL REC 12V
7	PB C
8	H' D SW
9	TRICK Ⓗ
10	FM DET
11	SL Ⓛ

FROM MAIN

9-11. VPS (OPTION)

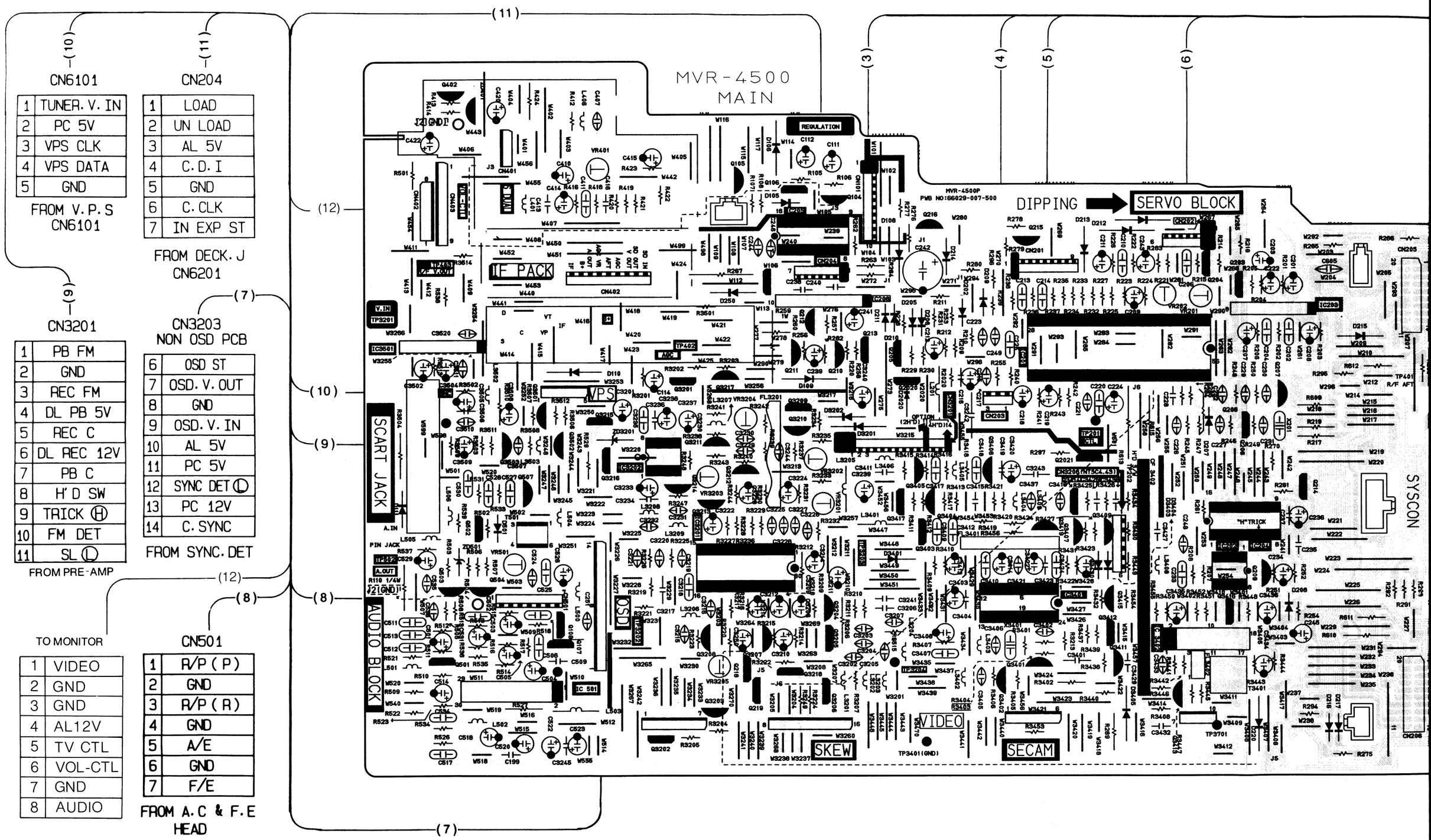


CN6101

1	TUNER. V. IN
2	PC 5V
3	VPS CLK
4	VPS DATA
5	GND

FROM MAIN
CN6101

9-12. Main



CN6101

1	TUNER. V. IN
2	PC 5V
3	VPS CLK
4	VPS DATA
5	GND

FROM V.P.S
CN6101

CN204

1	LOAD
2	UN LOAD
3	AL 5V
4	C. D. I
5	GND
6	C. CLK
7	IN EXP ST

FROM DECK. J
CN6201

CN3201

1	PB FM
2	GND
3	REC FM
4	DL PB 5V
5	REC C
6	DL REC 12V
7	PB C
8	H'D SW
9	TRICK Ⓗ
10	FM DET
11	SL Ⓛ

FROM PRE-AMP

CN3203
NON OSD PCB

6	OSD ST
7	OSD. V. OUT
8	GND
9	OSD. V. IN
10	AL 5V
11	PC 5V
12	SYNC DET Ⓛ
13	PC 12V
14	C. SYNC

FROM SYNC. DET

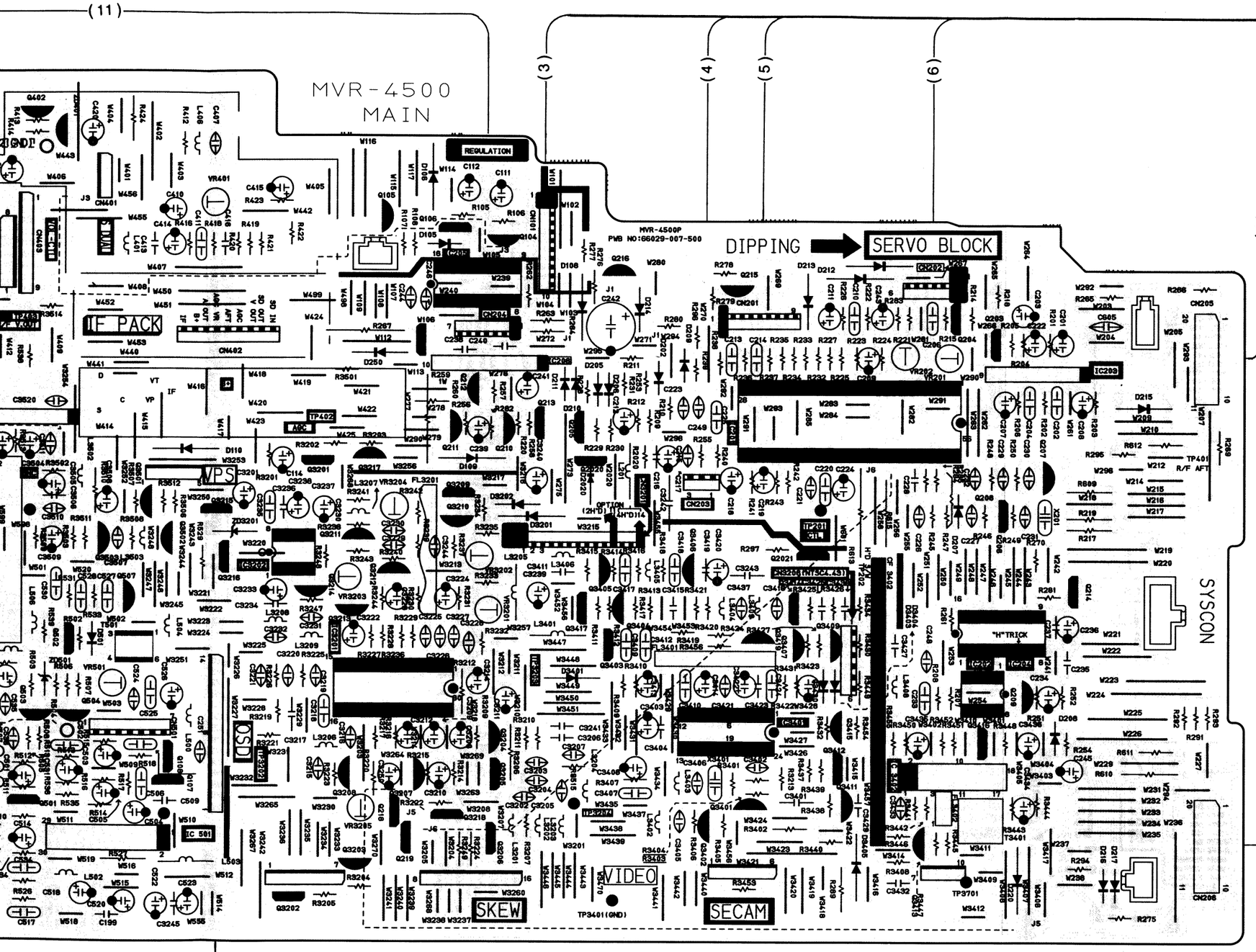
TO MONITOR

1	VIDEO
2	GND
3	GND
4	AL12V
5	TV CTL
6	VOL-CTL
7	GND
8	AUDIO

CN501

1	R/P (P)
2	GND
3	R/P (R)
4	GND
5	A/E
6	GND
7	F/E

FROM A. C & F. E
HEAD



CN205

1	PC 5V
2	GND
3	AC 4.2V
4	C.CLK
5	C.D.O
6	IN EXP ST
7	ROTARY SW
8	PLL ST
9	-30V
10	GND
11	AFT
12	C.D.I
13	OSD ST
14	GND
15	GND
16	AL 5V
17	NTSC Ⓗ
18	SECAM Ⓗ
19	N.C
20	PIC.CTL

FROM TIMER
CN702

CN206

1	DMC 1
2	DMC 2
3	H'D SW
4	ENV.DET
5	CAP FG CD
6	CTL CD
7	OUT EXP ST
8	H.A.SW
9	S.CLK
10	S.D.O
11	GND
12	AC 4.2V
13	BU 5V
14	STEP/SLOW
15	CM CTL
16	DUTY I/O
17	VPS DATA
18	V.ENV
19	SYNC DET
20	VP CLK

FROM TIMER
CN703

CN101

1	AC 4.2V
2	AC 4.2V
3	-30V
4	GND
5	GND
6	AL 40V
7	AL 5.8V
8	AL 12V
9	MOTOR GND
10	MOTOR AL 15V

FROM
REG ASSY
CN102

CN201

1	PC 5V
2	R/F
3	C.FG
4	CTL REF
5	CM CTL
6	I.LIMIT
7	VCO
8	MOTOR GND
9	IC.GND

FROM DECK.J
CN6205

CN203

1	GND
2	CTL (+)
3	CTL (-)

FROM A.C
CN001

CN202

1	D.PG
2	GND
3	D.FG
4	D.MOTOR B+
5	DM CTL
6	MOTOR GND

FROM
DRUM MOTOR

9-13. Function

CN701

1	GND
2	KEY IN 1
3	KEY IN 2
4	KEY IN 3
5	S 8
6	S 7
7	S 9
8	S 4
9	S 2
10	PC 5V
11	PIC. CTL

FROM FUNC
CN704

CN702

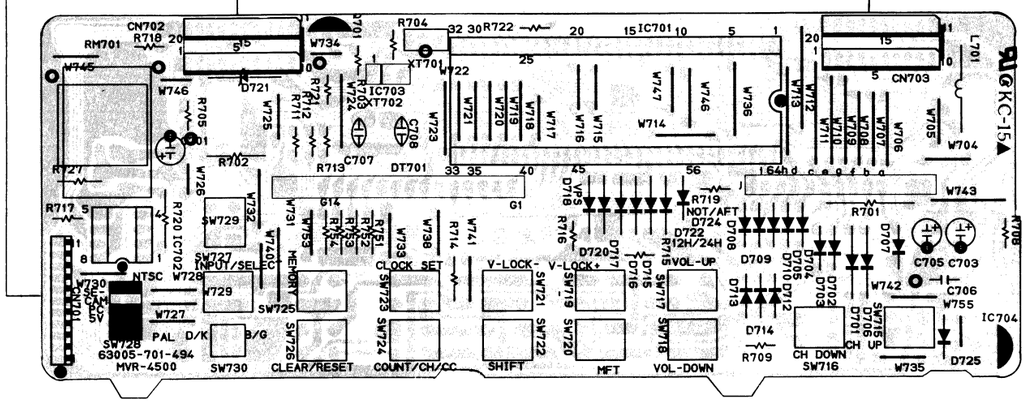
1	PC 5V
2	GND
3	AC 4.2V
4	C. CLK
5	C. D. O
6	IN EXP ST
7	ROTARY SW
8	PLL ST
9	-30V
10	GND
11	AFT
12	C. D. I
13	OSD ST
14	GND
15	GND
16	AL 5V
17	NTSC Ⓗ
18	SECAM Ⓗ
19	N. C
20	PIC. CTL

FROM MAIN
CN205

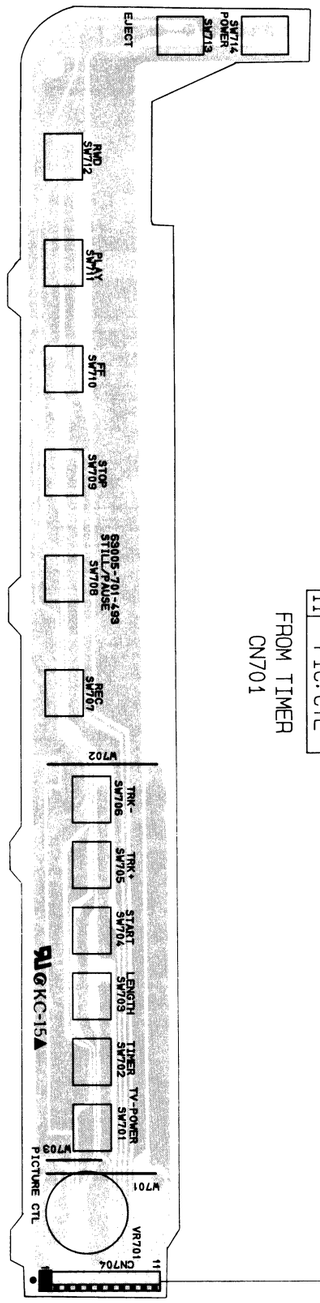
CN703

1	DMC 1
2	DMC 2
3	H' D SW
4	ENV. DET
5	CAP FG CD
6	CTL CD
7	OUT EXP ST
8	H. A. SW
9	S. CLK
10	S. D. O
11	GND
12	AC 4.2V
13	BU 5V
14	STEP/SLOW
15	CM CTL
16	DUTY I/O
17	VPS DATA
18	V. ENV
19	SYNC DET
20	VP CLK

FROM MAIN
CN206



9-14. Volune — Control



CN704

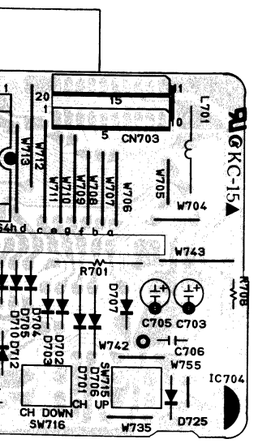
1	GND
2	KEY IN 1
3	KEY IN 2
4	KEY IN 3
5	S 8
6	S 7
7	S 9
8	S 4
9	S 2
10	PC 5V
11	PIC. CTL

FROM TIMER
CN701

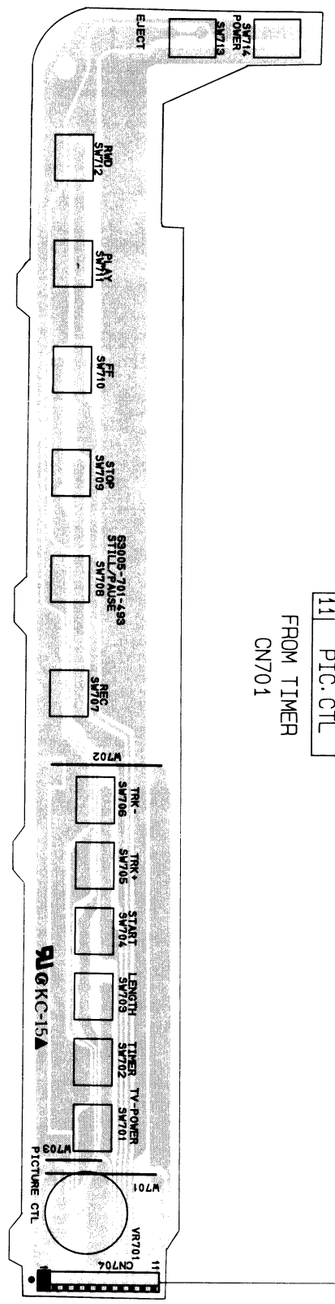
CN703

1	DMC 1
2	DMC 2
3	H'D SW
4	ENV. DET
5	CAP FG CD
6	CTL CD
7	OUT EXP ST
8	H. A. SW
9	S. CLK
10	S. D. O
11	GND
12	AC 4. 2V
13	BU 5V
14	STEP/SLOW
15	CM CTL
16	DUTY I/O
17	VPS DATA
18	V. ENV
19	SYNC DET
20	VP CLK

FROM MAIN
CN206



9-14. Volune—Control

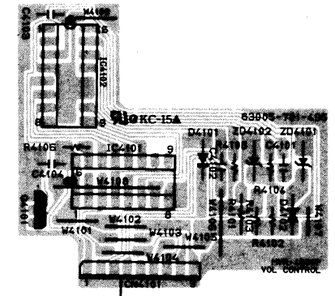


CN704

1	GND
2	KEY IN 1
3	KEY IN 2
4	KEY IN 3
5	S 8
6	S 7
7	S 9
8	S 4
9	S 2
10	PC 5V
11	PIC. CTL

FROM TIMER
CN701

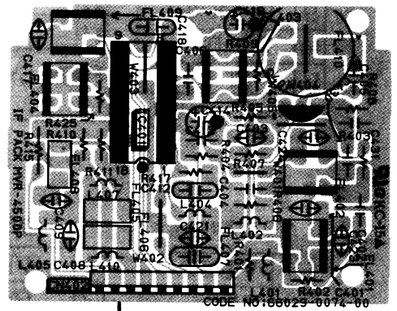
9-15. Timer



CN4101

AL5V	1
PC12V	2
VOL-CTL	3
TV-CTL	4
GND	5
−30V	6
DATA	7
CLOCK	8
STROBE	9

9-16. VIF-Pack



9	SD IN
8	SD OUT
7	V OUT
6	AGC
5	AFT
4	AGC VR
3	A OUT
2	B+
1	IF

REGULATOR

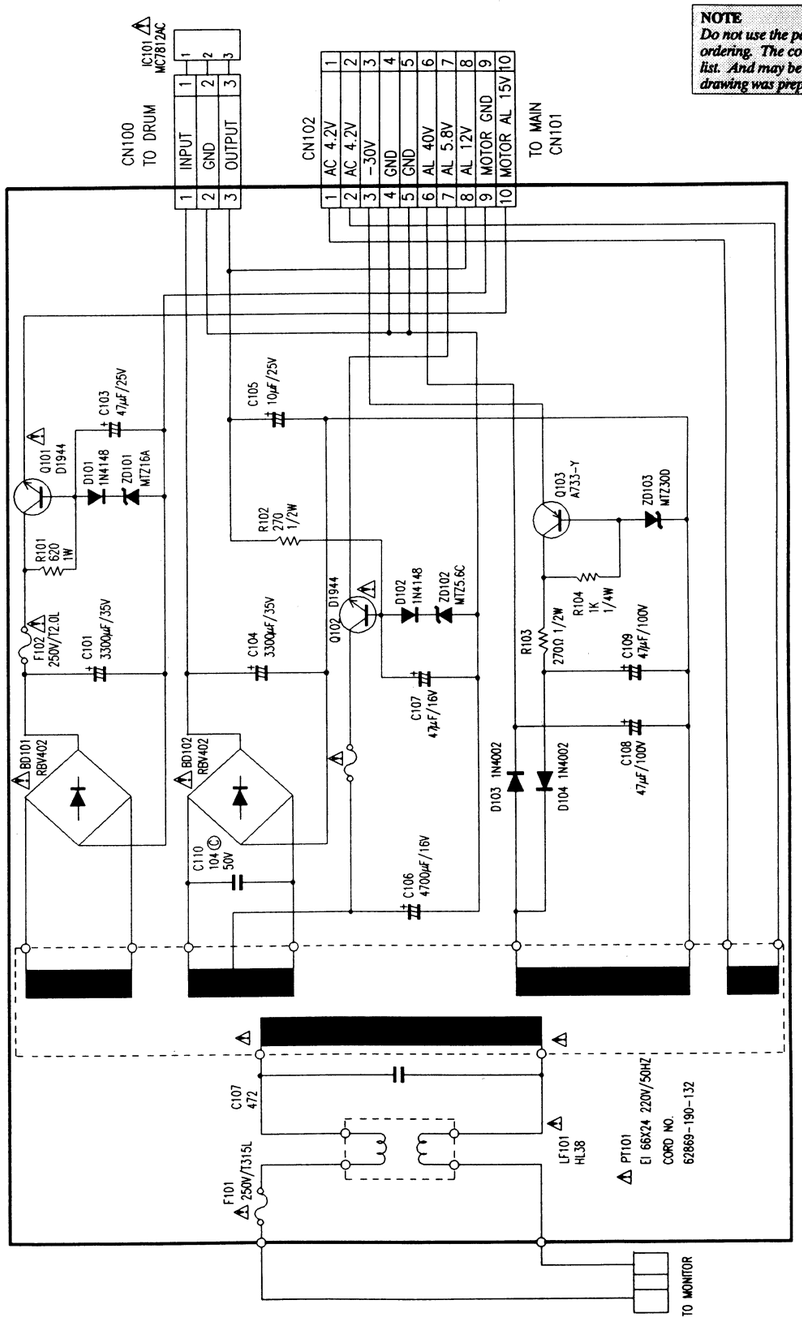
REGULATOR

10-1. Regulator

SPECIAL NOTE
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

NOTE
Do not use the part number shown on this drawing for ordering. The correct part number is shown in the parts list. And may be slightly different or amended since this drawing was prepared.

IMPORTANT SAFETY NOTICES
Components identified with the mark ⚠ have the special characteristics for safety when replacing any of these components. Use only the same type.



	Q101			Q102			Q103		
	E	C	B	E	C	B	E	C	B
STOP	15.4	18.5	16.04	5.9	8.8	6.5	-30.1	-30.1	-30.1
PB	15.3	18.1	16.0	5.9	8.6	6.5	-30.1	-30.1	-30.1
REC	15.3	17.5	15.9	5.9	8.6	6.5	-30.1	-30.2	-30.1

SYSTEM CONTROL/ TIMER
SYSTEM CONTROL/ TIMER

10-2. System Control / Timer

DIODE NO / OPTION	D718	D719	D715, 716, 717
BE/ NOT BE	VPS/ NOT VPS	1SPEED/ 2SPEED	PLL 1, 2, 3

DIODE NO / OPTION	D722	D723	D724	D720
BE/ NOT BE	12H/ 24H	4H'D/ 2H'D	NOT AFT / AFT	3IN /2IN

PIN NO	
PIN 1	
PIN 2	
PIN 3	
PIN 4	
PIN 5	
PIN 6	
PIN 7	
PIN 8	
PIN 9	
PIN 10	
PIN 11	
PIN 12	
PIN 13	
PIN 14	
PIN 15	
PIN 16	
PIN 17	
PIN 18	
PIN 19	
PIN 20	
PIN 21	
PIN 22	
PIN 23	
PIN 24	
PIN 25	
PIN 26	
PIN 27	
PIN 28	
PIN 29	
PIN 30	
PIN 31	
PIN 32	
PIN 33	
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PIN 46	
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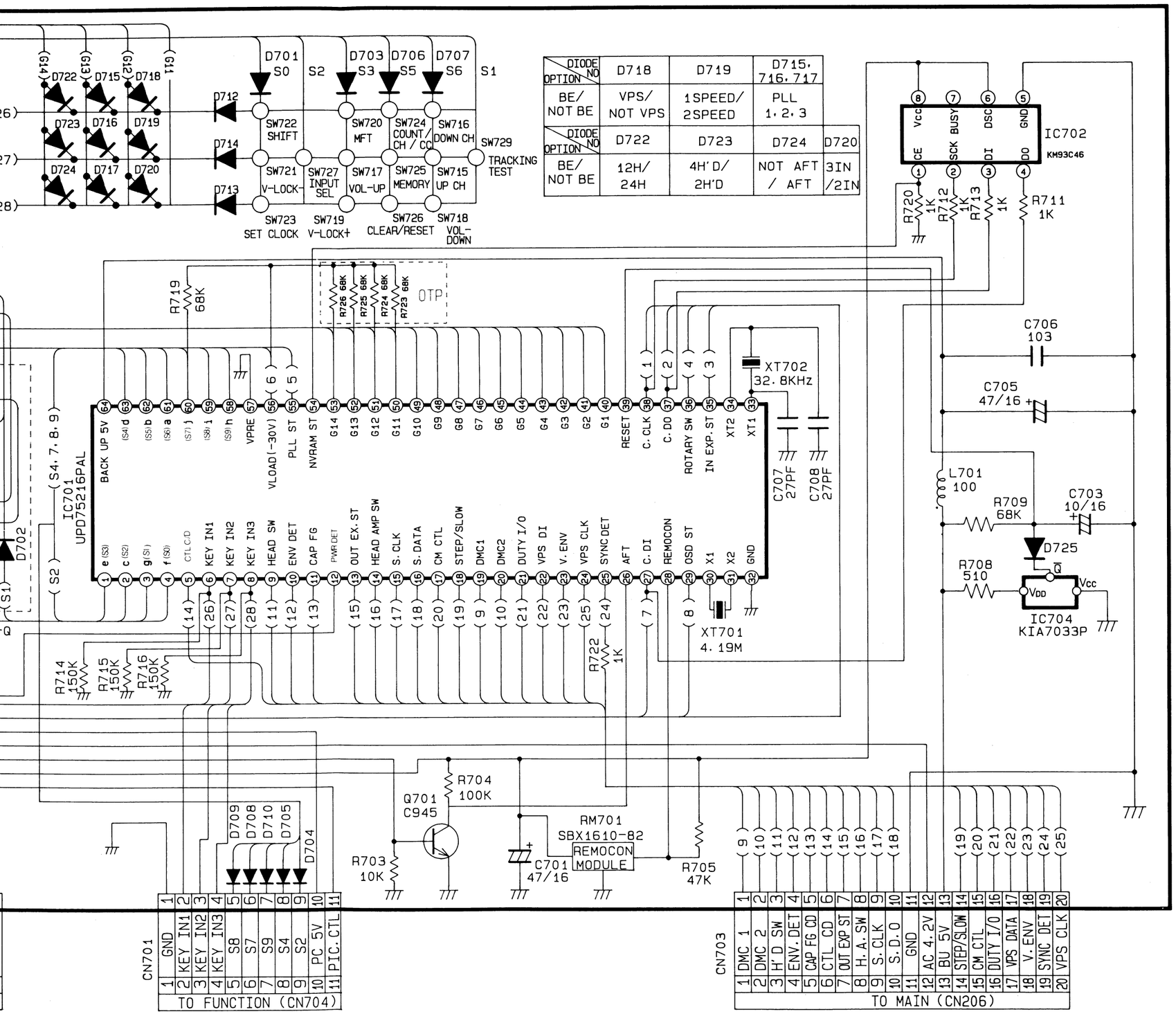
PIN 48	
PIN 49	
PIN 50	
PIN 51	
PIN 52	
PIN 53	
PIN 54	
PIN 55	
PIN 56	
PIN 57	
PIN 58	
PIN 59	
PIN 60	
PIN 61	
PIN 62	
PIN 63	
PIN 64	

NOTE
Do not use the part number shown on this drawing for ordering. The correct part number is shown in the parts list. And may be slightly different or amended since this drawing was prepared.

SPECIAL NOTE
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

SYSTEM CONTROL/
TIMER

SYSTEM CONTROL/
TIMER



NOTE
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SPECIAL NOTE
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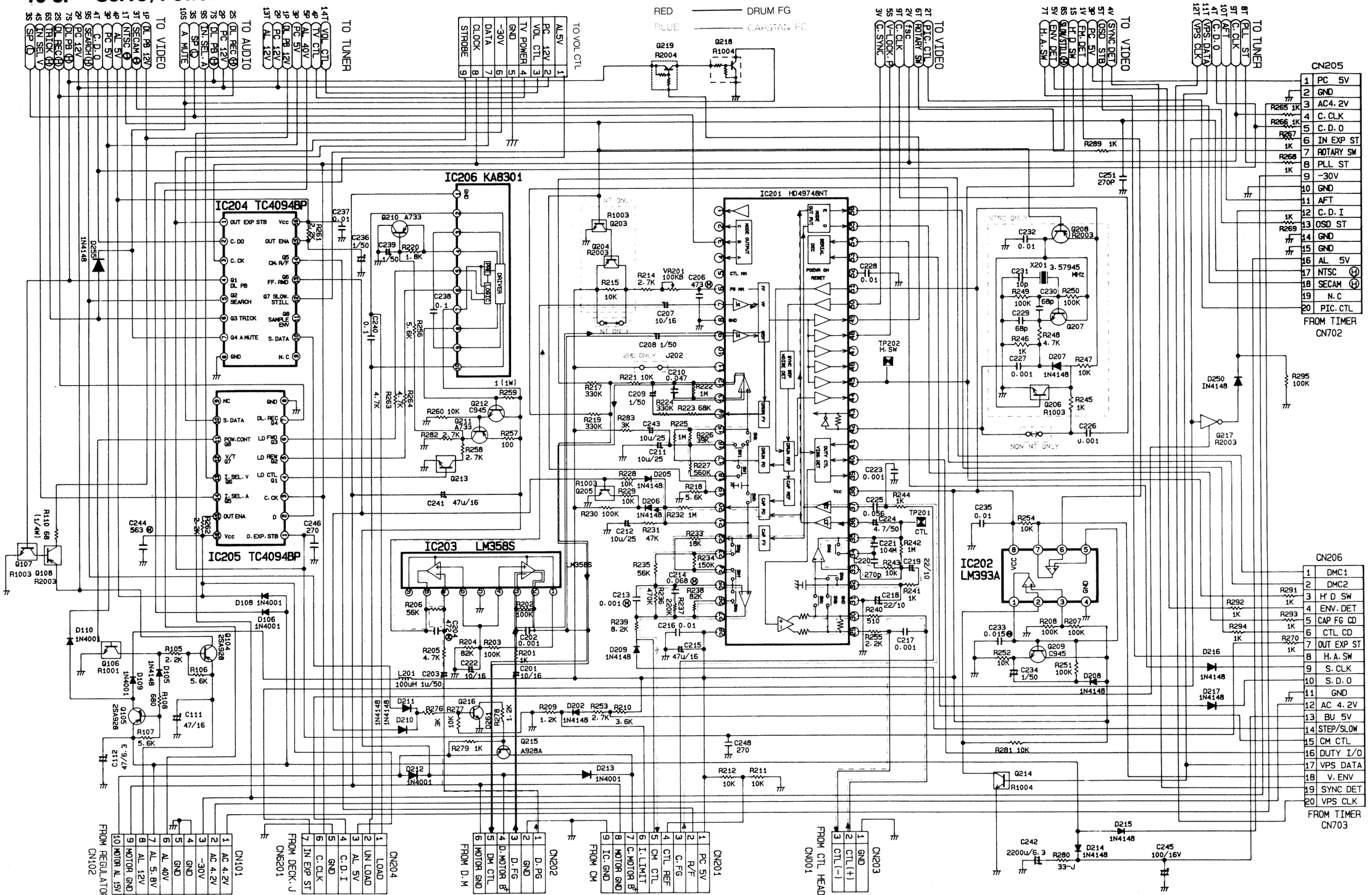
RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

MODE / PIN NO	IC701								
	STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	-16	-16	-16	-16	-16	-16	-16	-16	-16
PIN 2	-20	-27	-20	-20	-27	-27	-27	-27	-24
PIN 3	-12	-12	-12	-16	-16	-12	-12	-12	-12
PIN 4	-16	-20	-20	-16	-16	-20	-20	-20	-20
PIN 5	5.2	5	5	5	5	5	5	5	5
PIN 6	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3
PIN 7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
PIN 8	0	0	0	0	0	0	0	0	0
PIN 9	2.5	2.5	2.4	2.5	2.5	2.5	2.5	2.5	2.5
PIN 10	0	0	0	0	0	0	0	0	0
PIN 11	5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5
PIN 12	5	2.5	5	2.5	2.5	2.5	2.5	2.5	5
PIN 13	0	0	0	0	0	0	0	0	0
PIN 14	0	0	0	0	0	0	0	0	0
PIN 15	5	5	5	5	5	5	5	5	5
PIN 16	5	5	5	5	5	5	5	5	5
PIN 17	0	2.6	2.8	2.6	2.6	2.6	2.6	2.6	0
PIN 18	0	0	0	0	0	0	0	0	0
PIN 19	2.3	2.3	2.4	0	0	0	0	0	2.3
PIN 20	2.3	2.3	2.4	2.3	2.3	2.4	2.4	2.4	2.3
PIN 21	5	5	5	5	5	5	5	5	5
PIN 22	5	5	5	5	5	5	5	5	5
PIN 23	5	5	5	5	5	5	5	5	5
PIN 24	5	5	5	5	5	5	5	5	5
PIN 25	0	0	0	0	0	0	0	0	0
PIN 26	0	0	5.2	0	0	5	5	5	5.2
PIN 27	0	5	5	0	0	5	5	5	5
PIN 28	5.2	5	5	5.2	5	5	5	5	5.2
PIN 29	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
PIN 30	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
PIN 31	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
PIN 32	0	0	0	0	0	0	0	0	0
PIN 33	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
PIN 34	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PIN 35	5	5	5	5	5	5	5	5	5
PIN 36	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.5
PIN 37	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
PIN 38	3	3	3	3	3	3	3	3	3
PIN 39	5	5	5	5	5	5	5	5	5
PIN 40	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 41	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 42	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 43	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 44	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 45	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 46	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 47	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 48	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 49	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 50	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 51	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 52	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 53	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 54	0	0	0	0	0	0	0	0	0
PIN 55	0	0	0	0	0	0	0	0	0
PIN 56	-30	-30	-30	-30	-30	-30	-30	-30	-30
PIN 57	0	0	0	0	0	0	0	0	0
PIN 58	-27	-27	-27	-27	-27	-27	-27	-27	-27
PIN 59	-25	-23	-25	-25	-25	-25	-25	-25	-25
PIN 60	-25	-30	-30	-30	-30	-30	-30	-30	-30
PIN 61	-18	-18	-18	-18	-18	-18	-18	-18	-18
PIN 62	-14	-20	-14	-14	-14	-20	-20	-20	-20
PIN 63	-18	-20	-18	-20	-20	-20	-20	-20	-20
PIN 64	0	0	0	0	0	0	0	0	0

SERVO/POWER
SERVO/POWER

10-3. Servo / Power



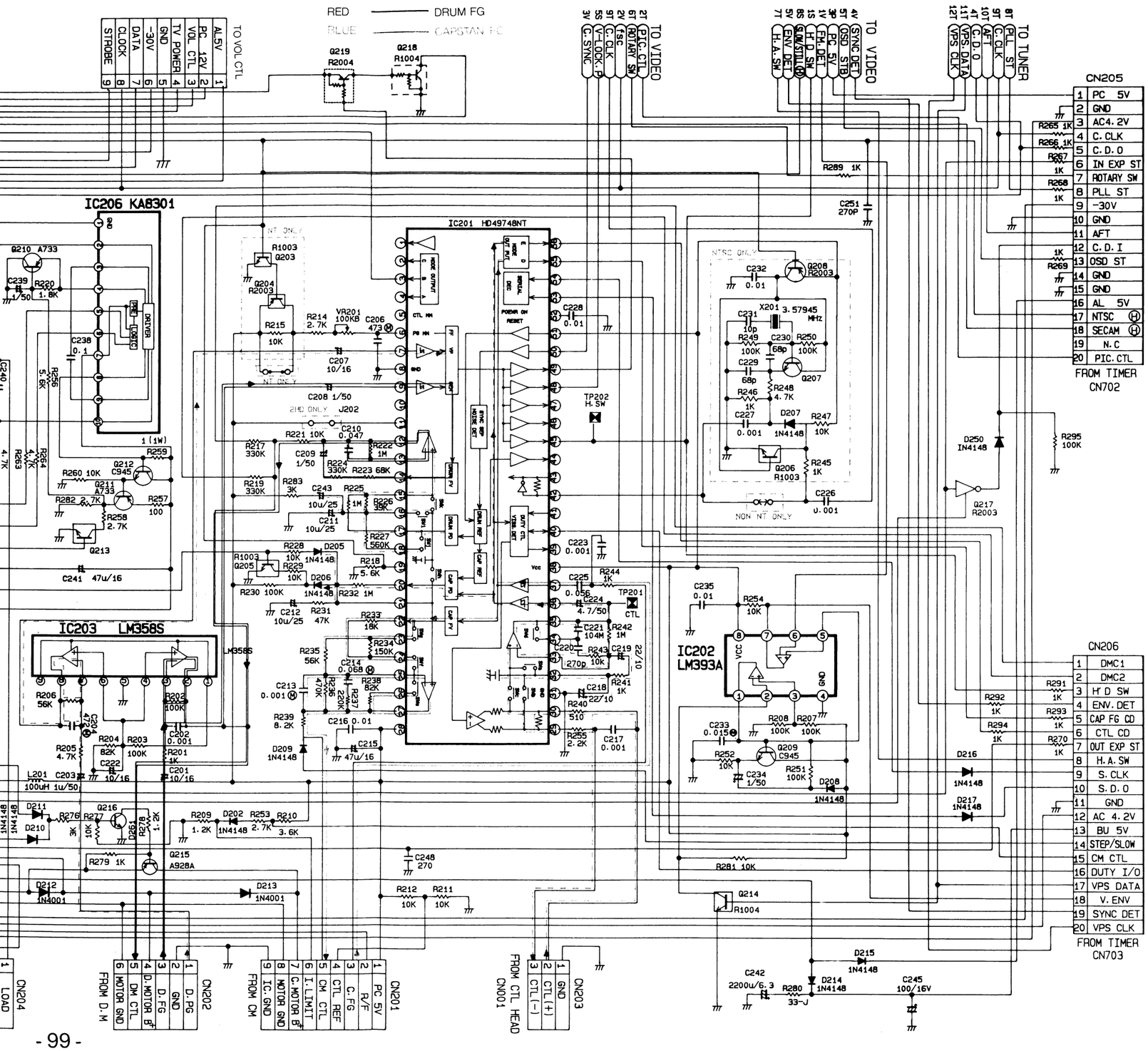
NOTE
Do not use the part number shown on this drawing for ordering. The correct part number is shown in the parts list. And may be slightly different or amended since this drawing was prepared.

SPECIAL NOTE
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

MODE / PIN NO	STO
PIN 1	3.
PIN 2	
PIN 3	
PIN 4	
PIN 5	
PIN 6	
PIN 7	
PIN 8	
PIN 9	2.
PIN 10	
PIN 11	
PIN 12	2.
PIN 13	2.
PIN 14	2.
PIN 15	2.
PIN 16	2.
PIN 17	2.
PIN 18	2.
PIN 19	0.
PIN 20	
PIN 21	2.
PIN 22	
PIN 23	
PIN 24	
PIN 25	0.
PIN 26	
PIN 27	
PIN 28	
PIN 29	2.
PIN 30	2.
PIN 31	
PIN 32	2.
PIN 33	2.
PIN 34	2.
PIN 35	2.
PIN 36	2.
PIN 37	2.
PIN 38	
PIN 39	
PIN 40	
PIN 41	
PIN 42	2.
PIN 43	0.
PIN 44	2.
PIN 45	2.
PIN 46	2.
PIN 47	2.
PIN 48	
PIN 49	
PIN 50	
PIN 51	
PIN 52	
PIN 53	
PIN 54	
PIN 55	
PIN 56	

SERVO/POWER

SERVO/POWER



RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

MODE / PIN NO	IC201								
	STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	3.5	3.5	3.5	3.5	3.5	3.5	3.5	0	3.5
PIN 2	0	0	0	0	0	0	0	0	0
PIN 3	0	0	0	0	0	0	0	0	0
PIN 4	5	5	5	5	5	5	5	5	5
PIN 5	0	0	0	0	0	0	0	0	0
PIN 6	0	0	0	0	0	0	0	0	0
PIN 7	2	2	2.1	2.1	2.1	2	2	2	2
PIN 8	0	0	0	0	0	0	0	0	0
PIN 9	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.7	2.6
PIN 10	5	5	5	5	0	5	5	5	5
PIN 11	5	5	5	5	5	5	5	5	5
PIN 12	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
PIN 13	2.4	2.4	2.5	2.5	2.4	2.3	2.2	2.6	2.4
PIN 14	2.4	2.4	2.5	2.5	2.4	2.3	2.2	2.6	2.4
PIN 15	2.5	2.4	2.5	2.5	2.4	2.3	2.2	2.6	2.4
PIN 16	2.5	2.5	2.5	2.5	2.4	2.3	2.2	2.6	2.4
PIN 17	2.5	2.5	2.5	2.5	2.5	2.3	2.2	2.6	2.4
PIN 18	2.5	2.3	2.4	2.4	2.4	2.3	2.3	2.6	2.4
PIN 19	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PIN 20	5	2.5	2.5	2.5	2.5	2.5	0.1	2.5	5
PIN 21	2.5	2.5	2.5	2.5	0	2.5	0.1	2.5	2.5
PIN 22	0	2.5	2.5	2.5	2.5	2.5	2.4	2.5	0
PIN 23	0	2.5	2.5	0	2.5	2.5	2.4	2.5	1.8
PIN 24	0	2.5	2.5	0	2.5	2.5	2.5	2.5	0.2
PIN 25	0.5	2.5	2.5	2.4	2.5	2.5	2.4	2.5	2.5
PIN 26	5	2.5	2.5	2.6	2.6	2.6	2.7	2.6	2.4
PIN 27	5	2.6	2.6	2.6	2.6	2.6	2.7	2.6	3.2
PIN 28	5	5	5	5	5	5	5	5	5
PIN 29	2.5	2.4	2	2.4	2.4	2.4	2.5	2.4	2.4
PIN 30	2.5	2.5	3	2.4	2.4	2.4	2.4	2.4	2.4
PIN 31	0	0	0	0	0	0	0	0	0
PIN 32	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.5	2.4
PIN 33	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.5	2.4
PIN 34	2.5	2.5	2.5	0	0	0	0	0	0
PIN 35	2.5	2.5	2.5	2.5	2.6	2.6	2.4	2.6	2.4
PIN 36	2.5	2.5	2.5	2.5	2.6	2.6	2.4	2.6	2.4
PIN 37	2.7	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6
PIN 38	5	5	5	5	5	5	5	5	5
PIN 39	0	0	3.6	2.5	2.5	0	3	0	5
PIN 40	0	5	5	5	5	5	0	5	5
PIN 41	5	5	5	5	5	5	0	5	5
PIN 42	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
PIN 43	0.5	2.5	2.5	2.6	2.6	2.6	2.6	2.6	2.6
PIN 44	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PIN 45	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PIN 46	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PIN 47	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PIN 48	0	0	0	0	0	0	0	0	0
PIN 49	0	0	0	0	0	5	5	5	5
PIN 50	0	0	0.4	0.4	0.4	0.4	0.4	0.4	0.4
PIN 51	5	5	5	5	5	5	5	5	5
PIN 52	5	5	5	5	5	5	5	5	5
PIN 53	5	5	5	5	5	5	5	5	5
PIN 54	5	5	5	5	5	5	5	5	5
PIN 55	5	0	2.5	2.5	0	0	2.5	0	5
PIN 56	0	0	5	2.5	2.5	0	2.5	0	5

NOTE
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SPECIAL NOTE
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RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

PIN NO \ MODE	IC204								
	STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	0	0	0	0	0	0	0	0	0
PIN 2	1.6	1.7	1.9	1.9	1.9	1.1	1.2	1.1	1.7
PIN 3	3	3	3.2	3.2	3.2	2	2	2	2
PIN 4	0	0	5	5	0	0	4.7	4.8	5
PIN 5	0	5	4.9	4.9	0	0	4.7	4.7	5
PIN 6	0	0	0	0	4.9	4.8	4.7	4.8	0
PIN 7	0	0	5	0	0	5	5	5	0
PIN 8	0	0	0	0	0	0	0	0	0
PIN 9	3	3	3.2	3.2	3.2	1.7	1.7	1.7	2
PIN 10	1.7	1.7	1.7	1.7	1.7	1.9	1.9	1.7	1.1
PIN 11	0	5	5	5	5	0	0	0	5
PIN 12	0	5	5	5	5	0	0	0	5
PIN 13	0	5	5	0	5	0	0	0	5
PIN 14	0	0	0	0	0	5	5	0	0
PIN 15	4.2	5	5	5	5	4.1	4.1	4.2	5
PIN 16	5	0	5	5	5	5	5	5	5

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

PIN NO \ MODE	IC205								
	STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	0	0	0	0	0	0	0	0	0
PIN 2	0	1.7	1.7	1.8	1.7	1.9	1.9	1.9	1.1
PIN 3	3	3	3.2	3.2	3.2	2	2	2	0
PIN 4	5	5	0	0	0	0	5	5	4.7
PIN 5	5	0	0	0	0	0	4.9	5	0
PIN 6	0	0	0	0	0	0	4.9	5	4.7
PIN 7	0	0	0	0	0	0	0	0	5
PIN 8	0	0	0	0	0	0	0	0	0
PIN 9	3	3	3.1	3.2	3	2	2	2	1.7
PIN 10	1.7	1.7	1.9	1.9	1.9	1.1	1.1	1.1	1.9
PIN 11	5	0	0	0	0	0	5	5	0
PIN 12	5	0	0	0	0	0	5	5	5
PIN 13	5	0	0	4.6	4.6	5	0	5	0
PIN 14	0	0	0	5	0	0	0	0	0
PIN 15	5	4.2	4.1	4.1	4.1	5	5	5	4.1
PIN 16	5	5	5	5	5	5	5	0	5

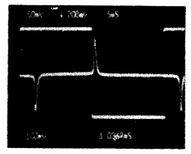
	Q104			Q105			Q107		
	E	C	B	E	C	B	E	C	B
STOP	12.2	12.1	11.4	5.88	5.80	5.1	0	0	0
PB	12.2	12.1	11.4	5.87	5.80	5.1	0	0	0
REC	12.17	12.1	11.38	5.86	5.80	5.09	0.2	-0.43	10.99

SERVO/POWER

SERVO/POWER

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

T R \ MODE		STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL	FPS
Q210 A733	E	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	B	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	C	0	0	0	0	0	0	0	0	0	0
Q211 A733	E	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
	B	14	14	14	14	14	14	14	14	14	14
	C	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Q212 C945	E	14	14	14	14	14	14	14	14	14	14
	B	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
	C	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
Q213 R1004	E	0	0	0	0	0	0	0	0	0	0
	B	5	5	5	5	5	5	5	5	5	5
	C	0	0	0	0	0	0	0	0	0	0
Q216 D261	E	0	0	0	0	0	0	0	0	0	0
	B	0	0	0.7	0.7	0.7	0.7	0.7	0.7	0	0
	C	15	15	0	0	0	0	0	0	15	15
Q215 A928	E	15	15	14.5	14.5	14.5	14.5	14.5	14.5	15	15
	B	15	15	15	15	15	15	15	15	15	15
	C	13.6	13.6	15	15	15	15	15	15	13.6	13.6
Q205 R1003	E	0	0	0	0	0	0	0	0	0	0
	B	0	0	5	5	5	5	5	5	0	0
	C	5	5	0	0	0	0	0	0	5	5
Q214 R1004	E	0	0	0	0	0	0	0	0	0	0
	B	5	5	5	5	5	5	5	5	5	5
	C	0	0	0	0	0	0	0	0	0	0
Q209 C945	E	4	4	4	4	4	4	4	4	4	4
	B	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	C	5	5	5	5	5	5	5	5	5	5

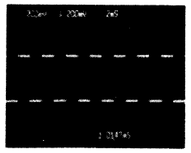


IC201-35
CTL PULSE/2Vp-p
PB

IC201-37
C.FG/1.75Vp-p
PB

IC201-42
4.43MHz/0.6Vp-p
PB

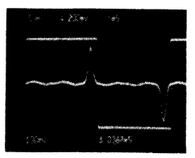
IC201-48
V-LOCK PULSE
PB



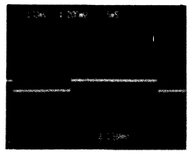
IC201-55
C.FG/5Vp-p
PB

IC201-56
CTL PULSE/5Vp-p
PB

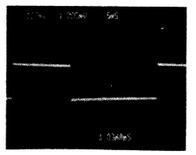
IC203-2
D.FG/1.7Vp-p
PB



IC203-8
D.PG/2Vp-p
PB



CN203-2
CTL PULSR
REC



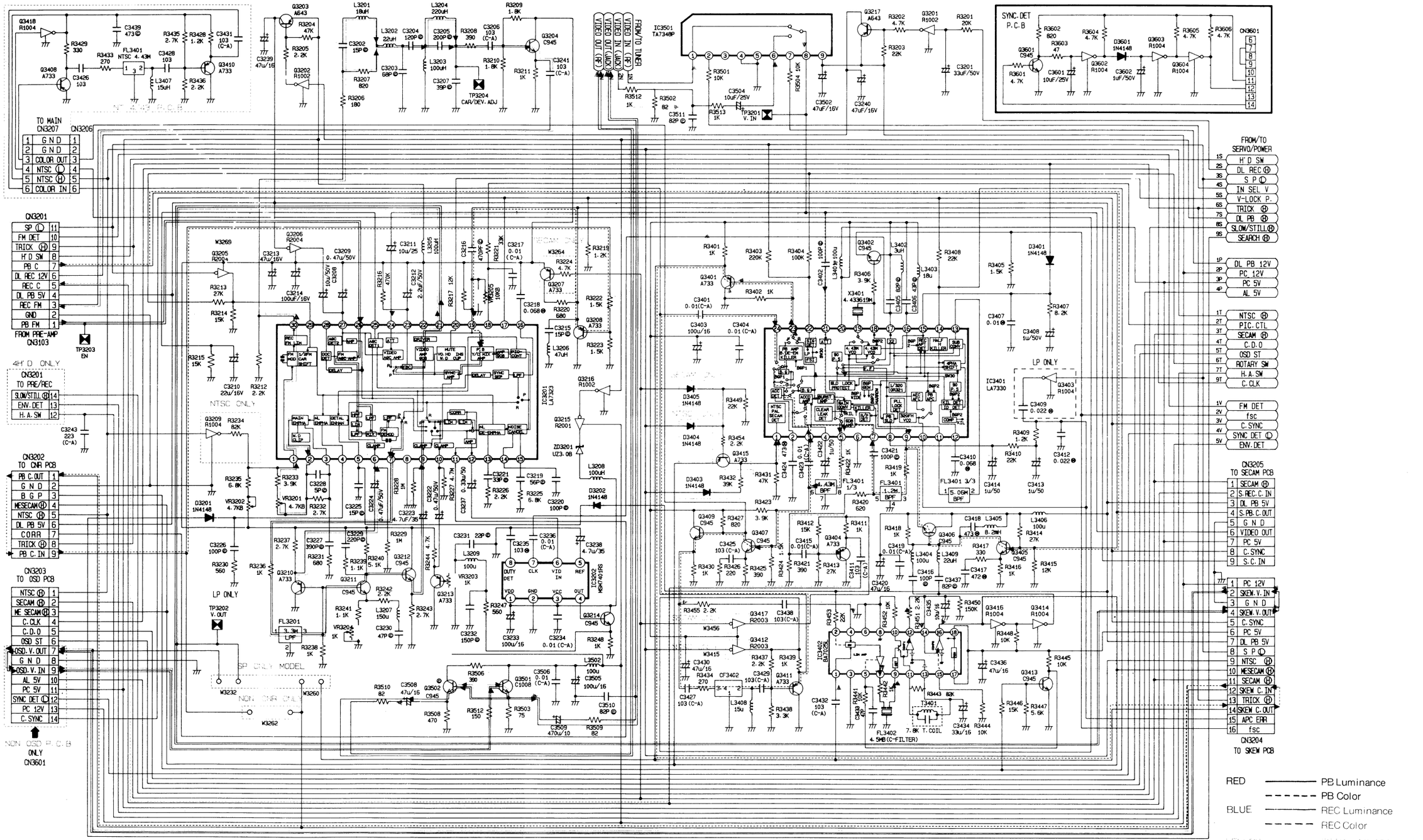
CN203-3
CTL PULSE
REC

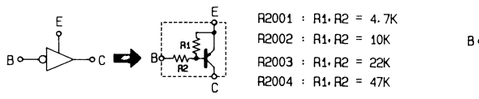
TP201
H'd S/W PULSE
PB/REC

LUMINANCE/
CHROMINANCE

LUMINANCE/
CHROMINANCE

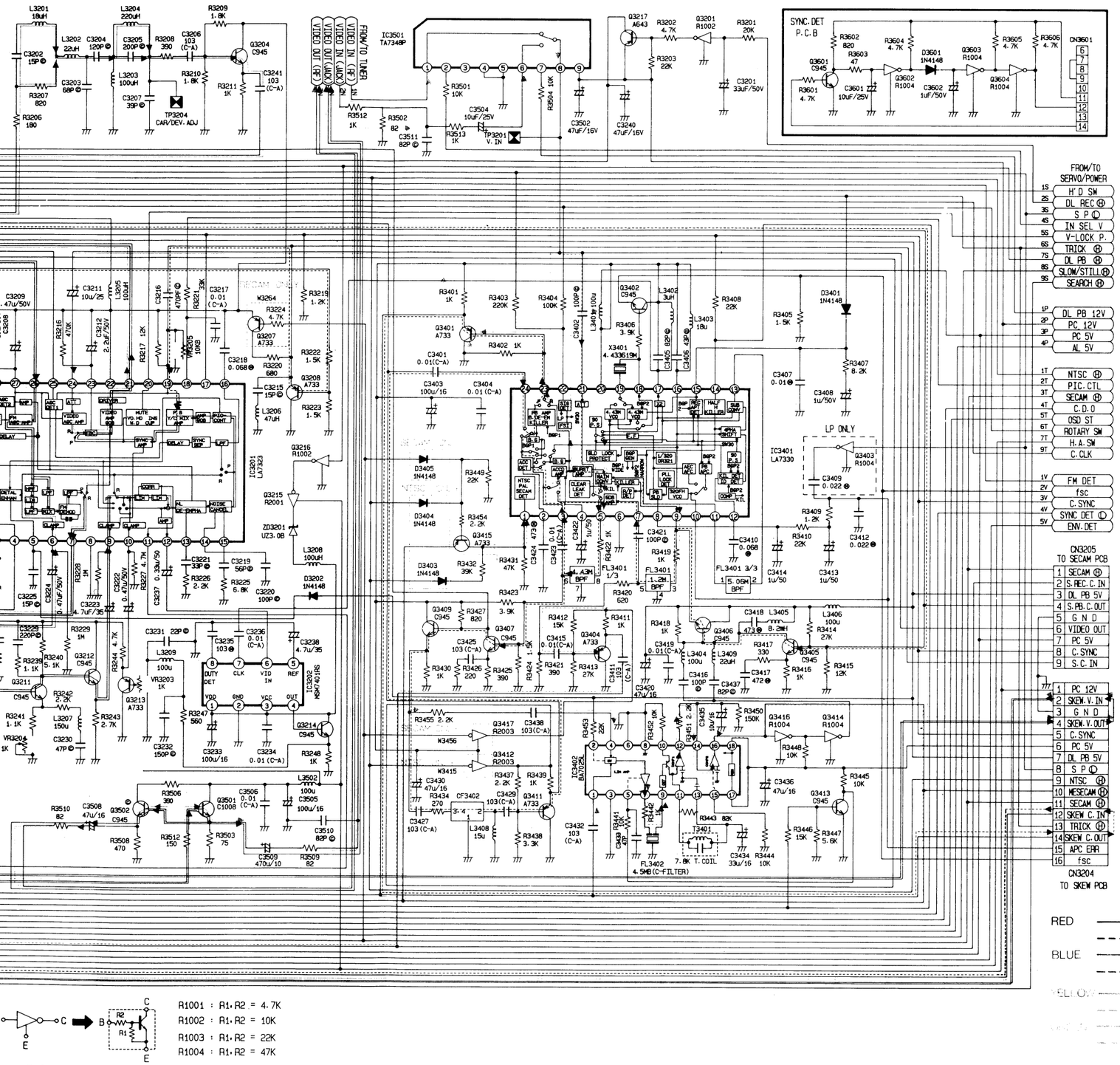
10-4. Luminance/Chrominance





LUMINANCE/ CHROMINANCE

LUMINANCE/ CHROMINANCE



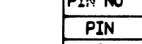
R1001 : R1, R2 = 4.7K
R1002 : R1, R2 = 10K
R1003 : R1, R2 = 22K
R1004 : R1, R2 = 47K

LUMINANCE/ CHROMINANCE

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

PIN NO \ MODE	IC3401								
	STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PIN 2	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.3	1.4
PIN 3	3	3	3.1	3.1	3.1	3	3	3	3
PIN 4	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4
PIN 5	1.7	2.5	1.7	1.6	1.7	2.6	2.6	2.6	2.6
PIN 6	0	0	0	0	0	0	0	0	0
PIN 7	3	3	3.1	3.1	3	3	3	3	3
PIN 8	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
PIN 9	1.8	3.8	1.8	1.8	1.8	3.8	3.8	3.9	3.9
PIN 10	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
PIN 11	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PIN 12	2	1.9	1.9	1.9	1.9	2	2	2	2
PIN 13	4.6	4.6	4.6	4.6	4.6	4.5	4.5	4.5	4.6
PIN 14	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
PIN 15	2.3	2.3	2.3	2.3	2.3	4.2	4.2	4.2	4.2
PIN 16	5	4.9	4.9	4.9	4.8	4.8	4.8	4.8	4.8
PIN 17	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
PIN 18	2.9	2.3	2.9	2.9	2.9	2.2	2.2	2.2	2.2
PIN 19	3.9	3.8	3.9	3.9	3.9	3.8	3.8	3.8	3.8
PIN 20	5	5	5	5	5	4.9	5	4.9	5
PIN 21	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
PIN 22	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
PIN 23	2.2	1.7	2.2	2.2	1.7	1.7	1.7	1.7	1.8
PIN 24	2.1	2.3	3.1	3.1	3.1	3.3	3.3	3.3	3.3

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

PIN NO \ MODE	IC3402								
	STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
PIN 2	0.3	1.2	0.3	0.3	0.3	1.2	1.2	1.2	1.2
PIN 3	0	0	0	0	0	0	0	0	0
PIN 4	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
PIN 5	5.1V / 0.2V 								
PIN 6	0	0	0	0	0	0	0	0	0
PIN 7	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
PIN 8	0	0	0	0	0	0	0	0	0
PIN 9	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
PIN 10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PIN 11	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
PIN 12	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PIN 13	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
PIN 14	0	0	0	0	0	0	0	0	0
PIN 15	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PIN 16	4.5 : MESECAM (H) 0.1 : PAL (L)								
PIN 17	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
PIN 18	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1

LUMINANCE/ CHROMINANCE

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

PIN NO \ MODE	IC3201 (CA7323)								
	STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	2.2	3.6	2.2	2.2	2.2	3.5	2.5	3.6	3.5
PIN 2	2.5	2.6	2.5	2.5	2.5	2.6	2.6	2.6	2.6
PIN 3	2.5	2.2	2.5	2.5	2.5	2.2	2.2	2.2	2.2
PIN 4	3.3	2.7	3.3	3.3	3.3	4.5	4.5	4.5	4.5
PIN 5	2.7	4.5	2.7	2.7	2.7	4.5	4.5	4.5	4.5
PIN 6	3.4	1.6	3.5	3.4	3.4	1.4	1.4	1.4	1.4
PIN 7	2.9	2.4	2.8	2.7	2.7	2.4	2.4	2.4	2.4
PIN 8	0	0	0	0	0	0	0	0	0
PIN 9	1	3.4	1	0.8	0.8	3.4	3.4	3.4	3.4
PIN 10	3.1	3.4	3.2	3.2	3.2	3.4	3.4	3.4	3.4
PIN 11	3.7	0.2	3.4	3.6	3.7	3.8	3.7	3.7	3.7
PIN 12	2.9	2.9	3	3	3	2.9	3	3	3
PIN 13	4.4	3.2	4.4	4.4	4.4	3.3	3.3	3.4	3.4
PIN 14	4.4	3.2	4.4	4.4	4.4	3.3	3.2	3.4	3.4
PIN 15	4.4	4	4.4	4.4	4.4	4	4	4	4
PIN 16	3.5	3.4	4.4	3.4	3.4	3.4	3.4	3.4	3.4
PIN 17	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
PIN 18	2.5	2.4	2.5	2.5	2.5	2.5	2.5	0	2.5
PIN 19	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
PIN 20	0	0	0	0	0	0.1	0.1	0.1	0.1
PIN 21	2.6	2.4	2.5	2.5	2.5	2.4	2.4	2.4	2.4
PIN 22	5	5	5	5	5	5	5	5	5
PIN 23	3.5	3.2	3.6	3.6	3.5	3.2	3.2	3.2	3.2
PIN 24	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
PIN 25	2.9	3.6	2.9	2.9	2.9	3.7	3.7	3.7	3.7
PIN 26	3.5	3.6	3.5	3.5	3.5	3.6	3.6	3.6	3.6
PIN 27	1.4	0.8	1.5	1.5	1.5	0.8	0.8	0.8	0.8
PIN 28	0	0.1	0	0	0	0.1	0.1	0.1	0.1
PIN 29	5	5	5	5	5	5	5	5	5
PIN 30	3.4	4	3.4	3.4	3.4	4	4	4	4

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

PIN NO \ MODE	IC3202 (MSM7401RS)								
	STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	0	8.6	0	0	0	8.6	8.6	8.6	8.6
PIN 2	0	0	0	0	0	0	0	0	0
PIN 3	0	8.6	0	0	0	8.6	8.6	8.6	8.6
PIN 4	0	3	0	0	0	3	3.3	3.3	3.3
PIN 5	3	3.3	0.6	3.1	3.0	3.3	3.3	3.3	3.3
PIN 6	0.3	2.2	0.3	0.4	0.4	2.2	2.2	2.2	2.2
PIN 7	0	1.6	0	0	0	1.6	1.6	1.6	1.6
PIN 8	0	4.9	0	0	0	4.9	4.9	4.9	4.9

PIN \ MODE	IC3501								
	1	2	3	4	5	6	7	8	9
STOP	8.2	4.8	8.2	0	0	8.2	0	7.5	11.9
REC	8.2	4.8	8.2	0	0	8.2	0	7.5	11.9
PLAY	8.2	4.8	8.2	0	0	8.2	8.8	7.5	11.9

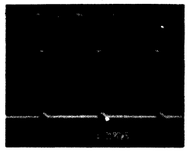
LUMINANCE/ CHROMINANCE

IC3201-2
WHITE/DARK/1.2Vp-p
REC

IC3201-6
0.55Vp-p
EE/REC

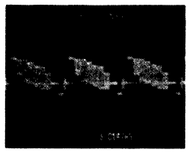
IC3201-7
1Vp-p
EE/REC

IC3201-10
PB D.O.C/0.5Vp-p
PB



IC3201-17
C SYNC/3.5Vp-p
EE/PB/REC

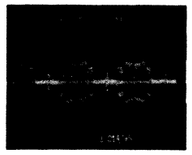
IC3201-19
PB MIX C IN
PB



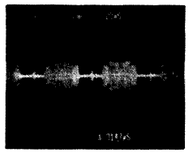
TP3201
VIDEO IN/1Vp-p
EE/REC

TP3202
VIDEO OUT/2Vp-p
EE

TP3202
PB Y OUT/2V
EE



IC3401-7
630KHz/250mVp-p
EE

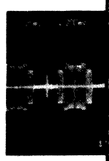


IC3401-9
EE C/0.8Vp-p
EE

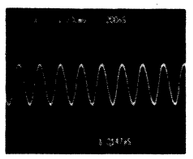
IC3401-9
PB ENV/800
PB

IC3401-17
2fsc(8.86MHz)/300mVp-p
EE/PB/REC

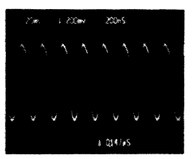
IC3401-21
C IN/800mVp-p
EE/REC



IC3401-23
500mVp-p
EE/REC



Q3402-E
EE fsc(4.433619MHz)
EE



Q3402-E
PB fsc(4.433619MHz)
PB

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

PS	J-RPS	J-FPS	STILL
1	0.1	0.1	0.1
4	1.4	1.3	1.4
3	3	3	3
4	2.4	2.4	2.4
6	2.6	2.6	2.6
0	0	0	0
3	3	3	3
8	2.8	2.8	2.8
8	3.8	3.9	3.9
8	2.8	2.8	2.8
5	2.5	2.5	2.5
2	2	2	2
5	4.5	4.5	4.6
4	0.4	0.4	0.4
2	4.2	4.2	4.2
8	4.8	4.8	4.8
9	4.9	4.9	4.9
2	2.2	2.2	2.2
8	3.8	3.8	3.8
9	5	4.9	5
6	1.6	1.6	1.6
9	1.9	1.9	1.9
7	1.7	1.7	1.8
3	3.3	3.3	3.3

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

PS	J-RPS	J-FPS	STILL
7	3.7	3.7	3.7
2	1.2	1.2	1.2
0	0	0	0
7	3.7	3.7	3.7
0	0	0	0
9	3.9	3.9	3.9
0	0	0	0
2	3.2	3.2	3.2
1	0.1	0.1	0.1
8	3.8	3.8	3.8
1	0.1	0.1	0.1
8	3.8	3.8	3.8
0	0	0	0
1	0.1	0.1	0.1
1	5.1	5.1	5.1
1	5.1	5.1	5.1

LUMINANCE/
CHROMINANCE

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

MODE / PIN NO	IC3201 (CA7323) STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	2.2	3.6	2.2	2.2	2.2	3.5	2.5	3.6	3.5
PIN 2	2.5	2.6	2.5	2.5	2.5	2.6	2.6	2.6	2.6
PIN 3	2.5	2.2	2.5	2.5	2.5	2.2	2.2	2.2	2.2
PIN 4	3.3	2.7	3.3	3.3	3.3	4.5	4.5	4.5	4.5
PIN 5	2.7	4.5	2.7	2.7	2.7	4.5	4.5	4.5	4.5
PIN 6	3.4	1.6	3.5	3.4	3.4	1.4	1.4	1.4	1.4
PIN 7	2.9	2.4	2.8	2.7	2.7	2.4	2.4	2.4	2.4
PIN 8	0	0	0	0	0	0	0	0	0
PIN 9	1	3.4	1	0.8	0.8	3.4	3.4	3.4	3.4
PIN 10	3.1	3.4	3.2	3.2	3.2	3.4	3.4	3.4	3.4
PIN 11	3.7	0.2	3.4	3.6	3.7	3.8	3.7	3.7	3.7
PIN 12	2.9	2.9	3	3	3	2.9	3	3	3
PIN 13	4.4	3.2	4.4	4.4	4.4	3.3	3.3	3.4	3.4
PIN 14	4.4	3.2	4.4	4.4	4.4	3.3	3.2	3.4	3.4
PIN 15	4.4	4	4.4	4.4	4.4	4	4	4	4
PIN 16	3.5	3.4	4.4	3.4	3.4	3.4	3.4	3.4	3.4
PIN 17	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
PIN 18	2.5	2.4	2.5	2.5	2.5	2.5	2.5	0	2.5
PIN 19	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
PIN 20	0	0	0	0	0	0.1	0.1	0.1	0.1
PIN 21	2.6	2.4	2.5	2.5	2.5	2.4	2.4	2.4	2.4
PIN 22	5	5	5	5	5	5	5	5	5
PIN 23	3.5	3.2	3.6	3.6	3.5	3.2	3.2	3.2	3.2
PIN 24	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
PIN 25	2.9	3.6	2.9	2.9	2.9	3.7	3.7	3.7	3.7
PIN 26	3.5	3.6	3.5	3.5	3.5	3.6	3.6	3.6	3.6
PIN 27	1.4	0.8	1.5	1.5	1.5	0.8	0.8	0.8	0.8
PIN 28	0	0.1	0	0	0	0.1	0.1	0.1	0.1
PIN 29	5	5	5	5	5	5	5	5	5
PIN 30	3.4	4	3.4	3.4	3.4	4	4	4	4

RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

MODE / PIN NO	IC3202 (MSM7401RS) STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	0	8.6	0	0	0	8.6	8.6	8.6	8.6
PIN 2	0	0	0	0	0	0	0	0	0
PIN 3	0	8.6	0	0	0	8.6	8.6	8.6	8.6
PIN 4	0	3	0	0	0	3	3.3	3.3	3.3
PIN 5	3	3.3	0.6	3.1	3.0	3.3	3.3	3.3	3.3
PIN 6	0.3	2.2	0.3	0.4	0.4	2.2	2.2	2.2	2.2
PIN 7	0	1.6	0	0	0	1.6	1.6	1.6	1.6
PIN 8	0	4.9	0	0	0	4.9	4.9	4.9	4.9

MODE / PIN	IC3501 1	2	3	4	5	6	7	8	9
STOP	8.2	4.8	8.2	0	0	8.2	0	7.5	11.9
REC	8.2	4.8	8.2	0	0	8.2	0	7.5	11.9
PLAY	8.2	4.8	8.2	0	0	8.2	8.8	7.5	11.9

LUMINANCE/
CHROMINANCE

IC3201-2
WHITE/DARK/1.2Vp-p
REC

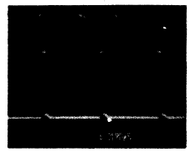
IC3201-6
0.55Vp-p
EE/REC

IC3201-7
1Vp-p
EE/REC

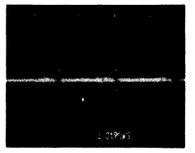
IC3201-7
PB DEMOD OUT/2Vp-p
PB

IC3201-9
DE EMPH OUT/0.5Vp-p
REC

IC3201-10
PB D.O.C/0.5Vp-p
PB



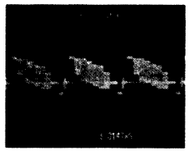
IC3201-17
C SYNC/3.5Vp-p
EE/PB/REC



IC3201-19
PB MIX C IN/250mVp-p
PB

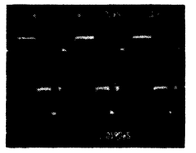
IC3201-30
REC FM/1.5Vp-p
REC

IC3202-6
VIDEO IN/0.5Vp-p
PB

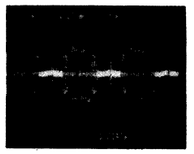


TP3201
VIDEO IN/1Vp-p
EE/REC

TP3202
VIDEO OUT/2Vp-p
EE

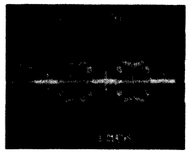


TP3202
PB Y OUT/2Vp-p
EE

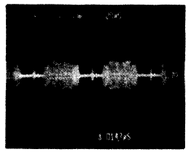


IC3401-3
EE C(4.43MHz)/170mVp-p
EE

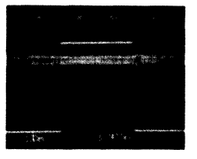
IC3401-3
PB C/250mVp-p
PB



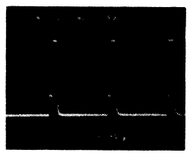
IC3401-7
630KHz/250mVp-p
EE



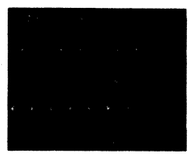
IC3401-9
EE C/0.8Vp-p
EE



IC3401-9
PB ENV/800mVp-p
PB

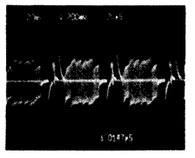


IC3401-14
B.G.P/4Vp-p
EE/PB/REC

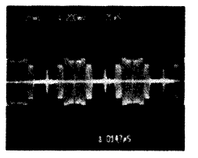


IC3401-16
321fh/600mVp-p
EE/PB/REC

IC3401-17
2fsc(8.86MHz)/300mVp-p
EE/PB/REC

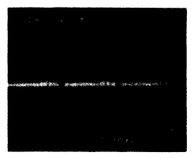


IC3401-21
C IN/800mVp-p
EE/REC

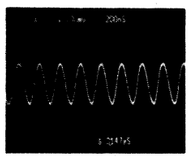


IC3401-23
500mVp-p
EE/REC

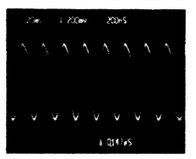
IC3401-23
PB C OUT/800mVp-p
PB



IC3401-24
PB C/250mVp-p
PB



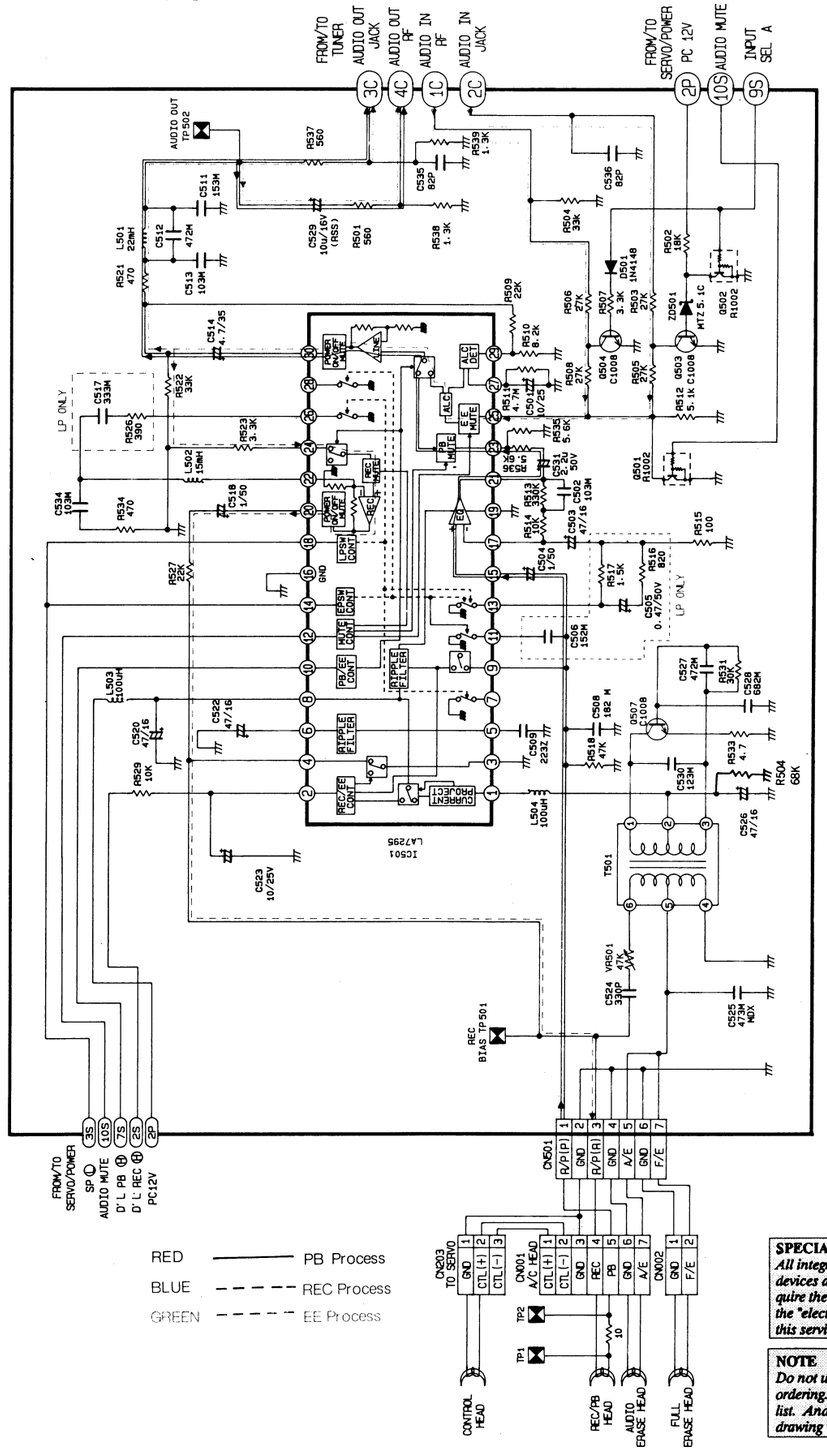
Q3402-E
EE fsc(4.433619MHz)
EE



Q3402-E
PB fsc(4.433619MHz)
PB

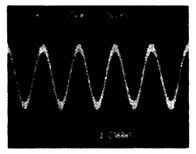
AUDIO
AUDIO

10-5. Audio

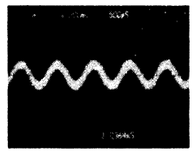


RPS : REVERSE SEARCH
J-RPS : JET REVERSE SEARCH
J-FPS : JET REVERSE SEARCH

PIN NO \ MODE	IC 501						
	STOP	REC	PLAY	REW	F.FWD	REV S.	FWD S.
PIN 1	0	10.8	OPEN	0	0	OPEN	OPEN
PIN 2	0	4.6	0	0	0	0	0
PIN 3	0	0	0	0	0	0	0
PIN 4	0	0	0	0	0	0	0
PIN 5	8	8	8	8	8	8	8
PIN 6	9	9	9	9	9	9	9
PIN 7	0	0	0	0	0	0	0
PIN 8	12	12	12	12	12	12	12
PIN 9	0	0	0	0	0	0	0
PIN 10	0	0	4.6	0	0	4.6	4.6
PIN 11	0	0	0	0	0	0	0
PIN 12	0	0	0	0	0	5	5
PIN 13	0	0	0	0	0	0	0
PIN 14	0	0	0	0	0	0	0
PIN 15	2.2	2.2	2.2	2.2	2.2	2.2	2.2
PIN 16	0	0	0	0	0	0	0
PIN 17	2.4	2.4	2.4	2.4	2.4	2.4	2.4
PIN 18	0	0	0	0	0	0	0
PIN 19	0	0	0	0	0	0	0
PIN 20	4	4	4	4	4	4	4
PIN 21	2.4	2.4	2.4	2.4	2.4	2.4	2.4
PIN 22	1.4	1.4	1.4	1.4	1.4	1.4	1.4
PIN 23	0	0	0	0	0	0	0
PIN 24	0	0	0	0	0	0	0
PIN 25	0	0	0	0	0	0	0
PIN 26	0	0	0	0	0	0	0
PIN 27	0.34	0.34	0.34	0.34	0.34	0.34	0.34
PIN 28	0	0	0	0	0	0	0
PIN 29	0	0	0	0	0	0	0
PIN 30	4	4	4	4	4	4	4



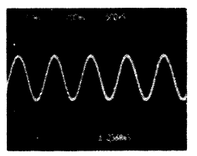
IC501-20
REC AMP IN/0.75Vp-p
REC



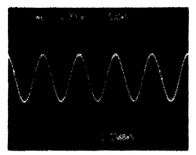
IC501-25
AUDIO IN/100mVp-p
EE/REC

TP501
REC BIAS/6Vp-p
REC

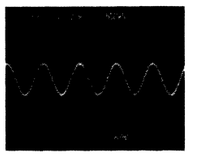
TP502
EE AUDIO OUT/1.7Vp-p
EE



TP502
PB AUDIO OUT/1.2Vp-p
PB



TP502
REC AUDIO OUT/1.4Vp-p
REC



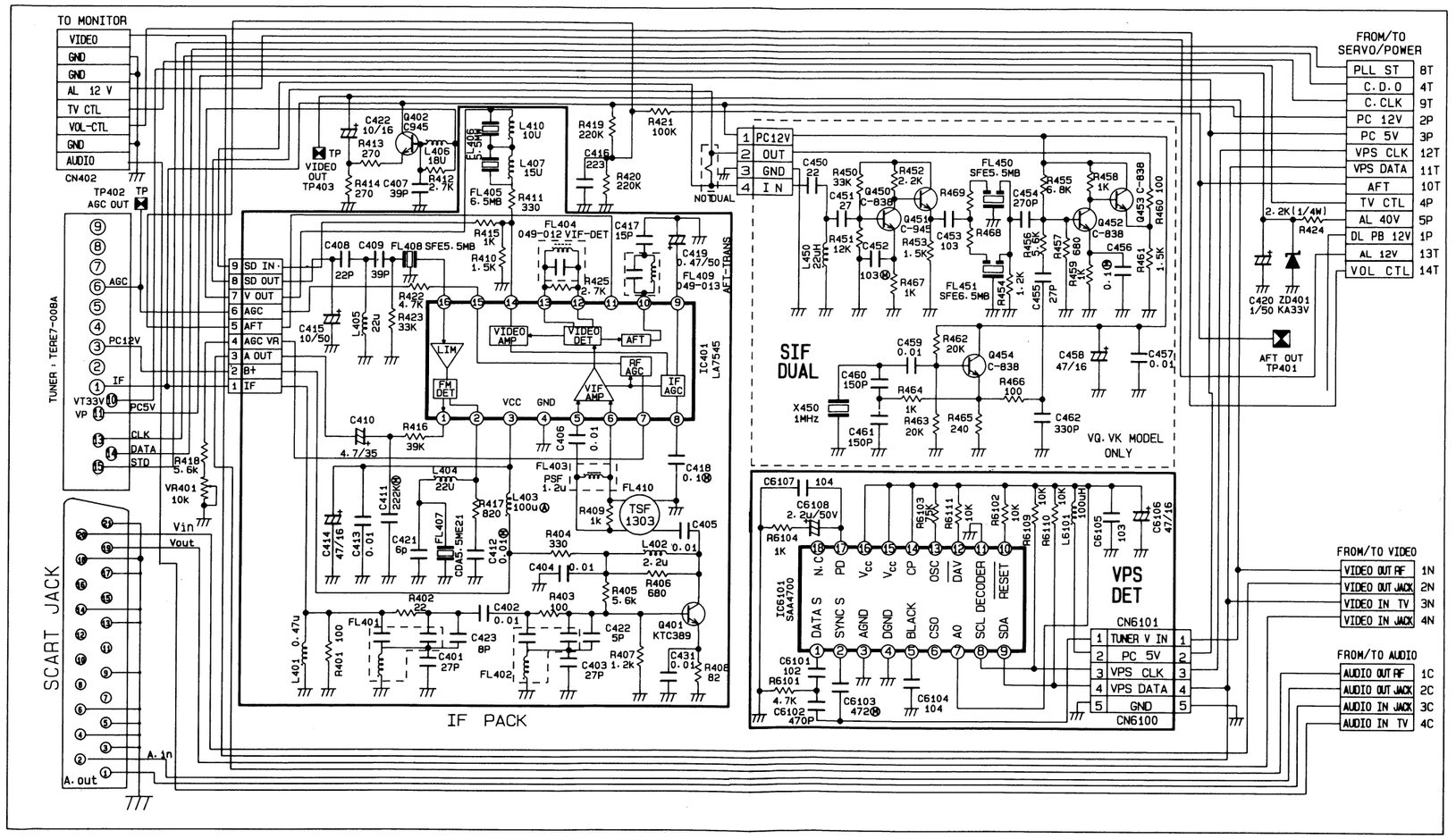
SCART JACK
AUDIO IN/1.8Vp-p

SPECIAL NOTE
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

NOTE
Do not use the part number shown on this drawing for ordering. The correct part number is shown in the parts list. And may be slightly different or amended since this drawing was prepared.

TUNER / VPS

10-6. Tuner / VPS



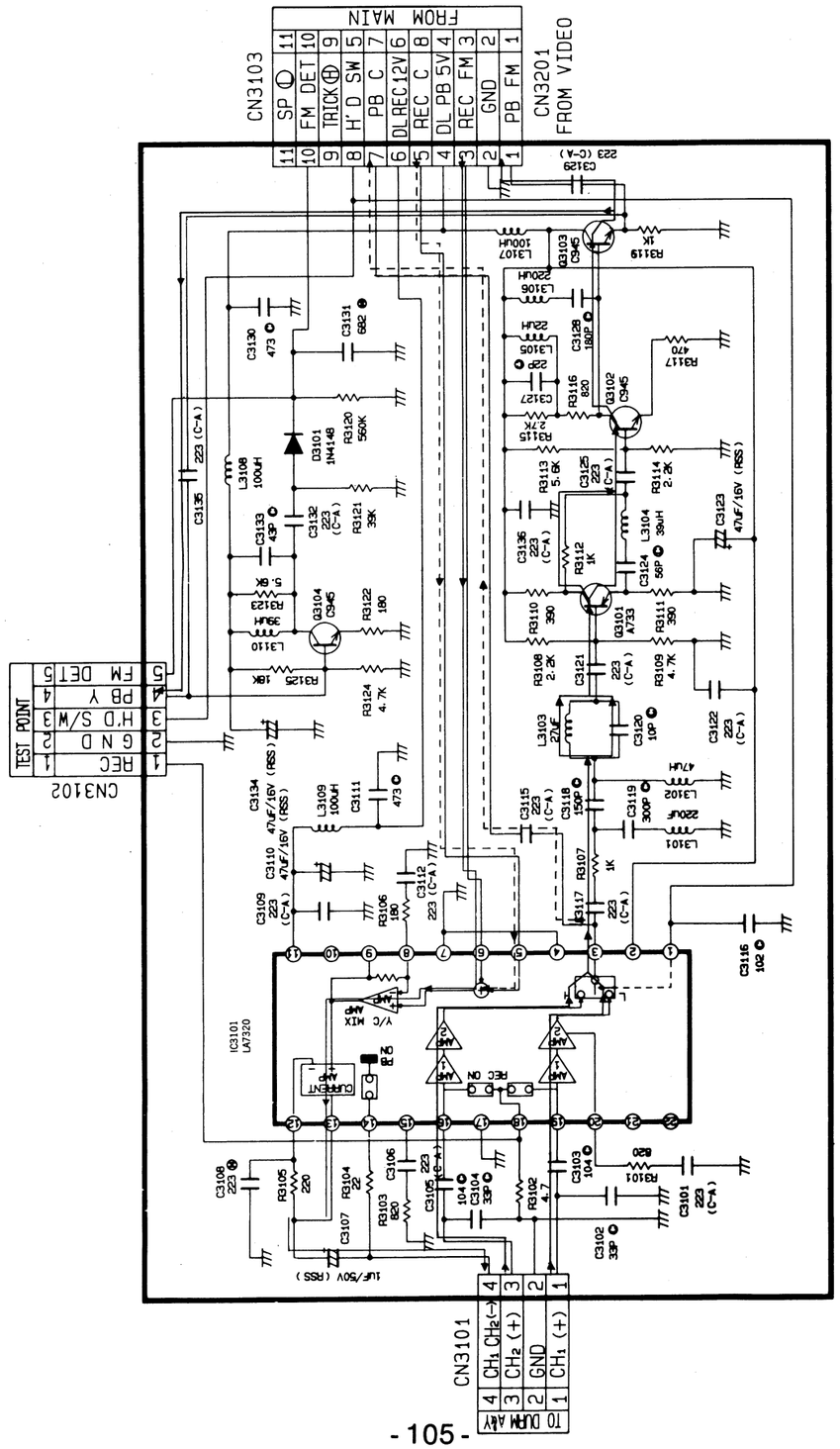
NOTE
Do not use the part number shown on this drawing for ordering. The correct part number is shown in the parts list. And may be slightly different or amended since this drawing was prepared.

SPECIAL NOTE
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

PRE-AMP

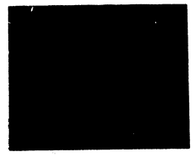
PRE-AMP

10-7. Pre Amp



IC3101-3
ENV/2Vp-p
PB

IC3102-1
REC FM/150mVp-p
REC



WAFER CN3102-3
REC FM/350mVp-p
REC

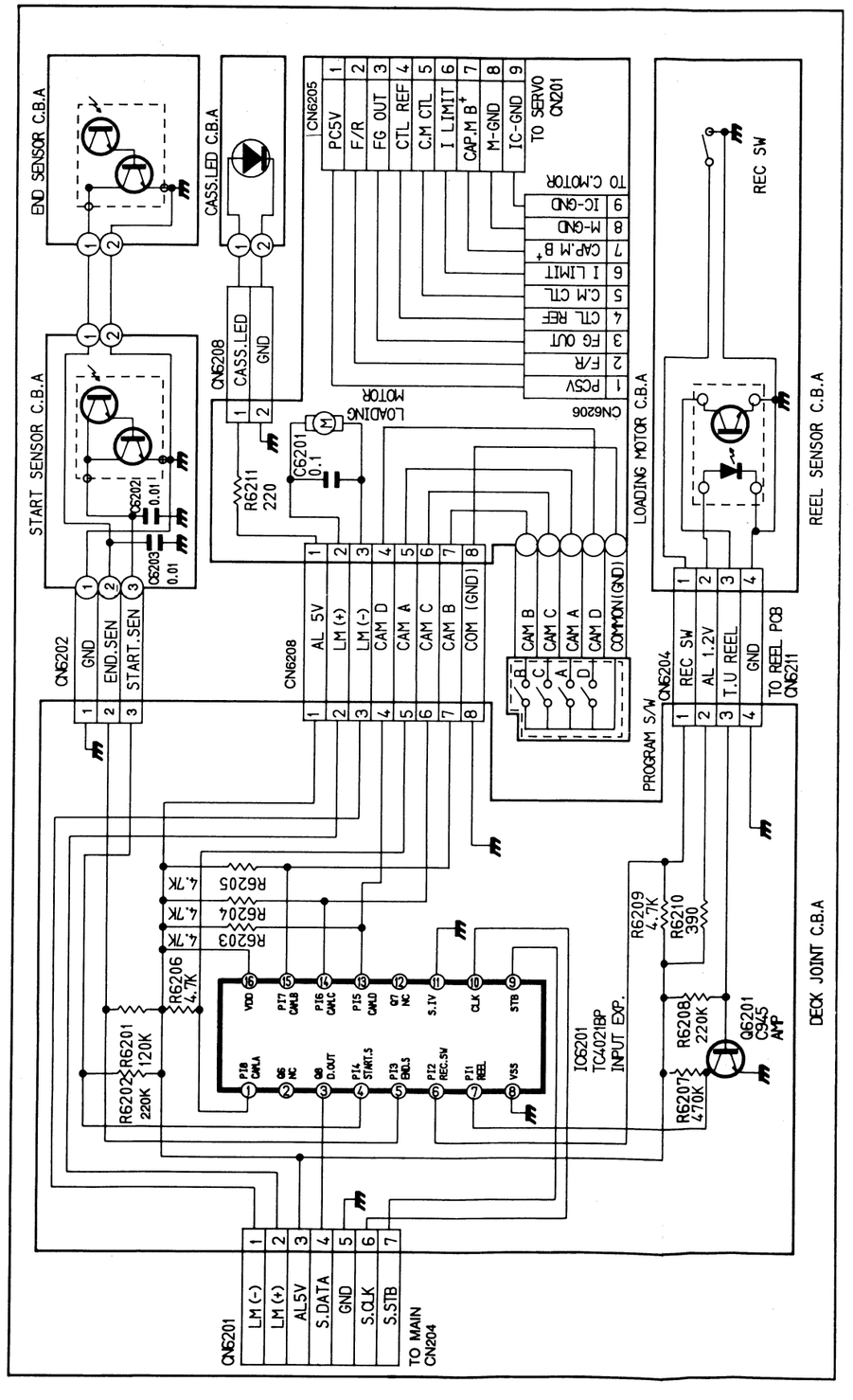
WAFER CN3102-4
ENV/300mVp-p
PB

WAFER CN3102-5
FM DET/0.5Vp-p
PB

SPECIAL NOTE
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

NOTE
Do not use the part number shown on this drawing for ordering. The correct part number is shown in the parts list. And may be slightly different or amended since this drawing was prepared.

10-8. Deck Joint

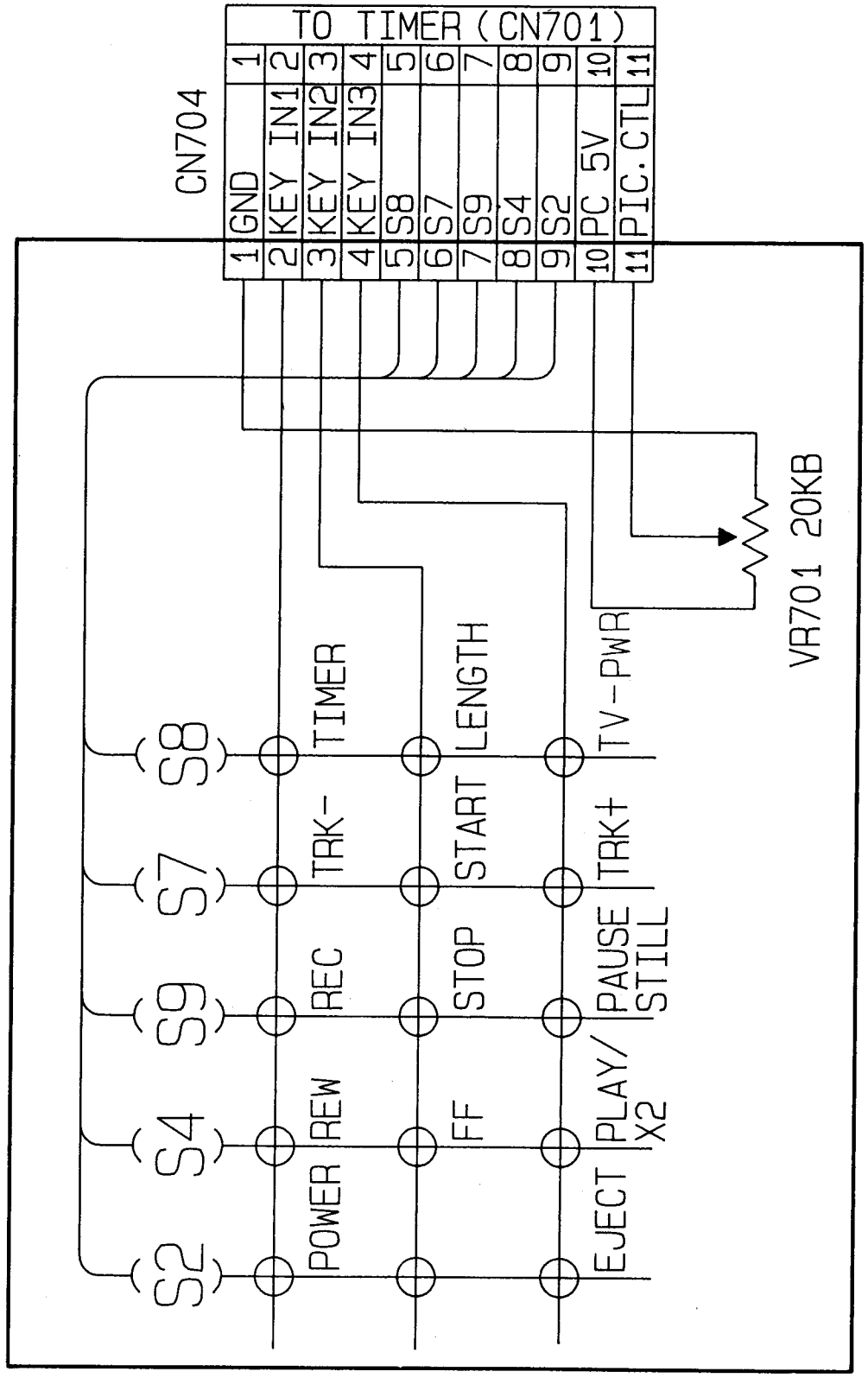


PIN NO \ MODE	IC 6201 TC4021BP								
	STOP	PLAY	REC	REW	FWD	RPS	J-RPS	J-FPS	STILL
PIN 1	0	5	5	0	0	5	5	5	5
PIN 2	0	0	0	5	5	5	5	0	0
PIN 3	0	5	5	0	0	5	5	5	5
PIN 4	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
PIN 5	5	4.8	4.8	4.8	5	4.8	4.8	4.8	4.8
PIN 6	5	5	5	5	5	5	5	5	5
PIN 7	0	0	0	2.6	2.6	2.2	2.2	2.2	0
PIN 8	0	0	0	0	0	0	0	0	0
PIN 9	5	5	5	5	5	5	5	5	5
PIN 10	3	3	3	3.2	3.2	2	2	2	2
PIN 11	0	0	0	0	0	0	0	0	0
PIN 12	5	5	5	5	5	0	0	5	5
PIN 13	5	0	0	0	0	5	0	0	5
PIN 14	0	0	0	5	5	5	5	0	0
PIN 15	5	5	5	5	5	0	0	5	5
PIN 16	5	5	5	5	5	5	5	5	5

SPECIAL NOTE
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

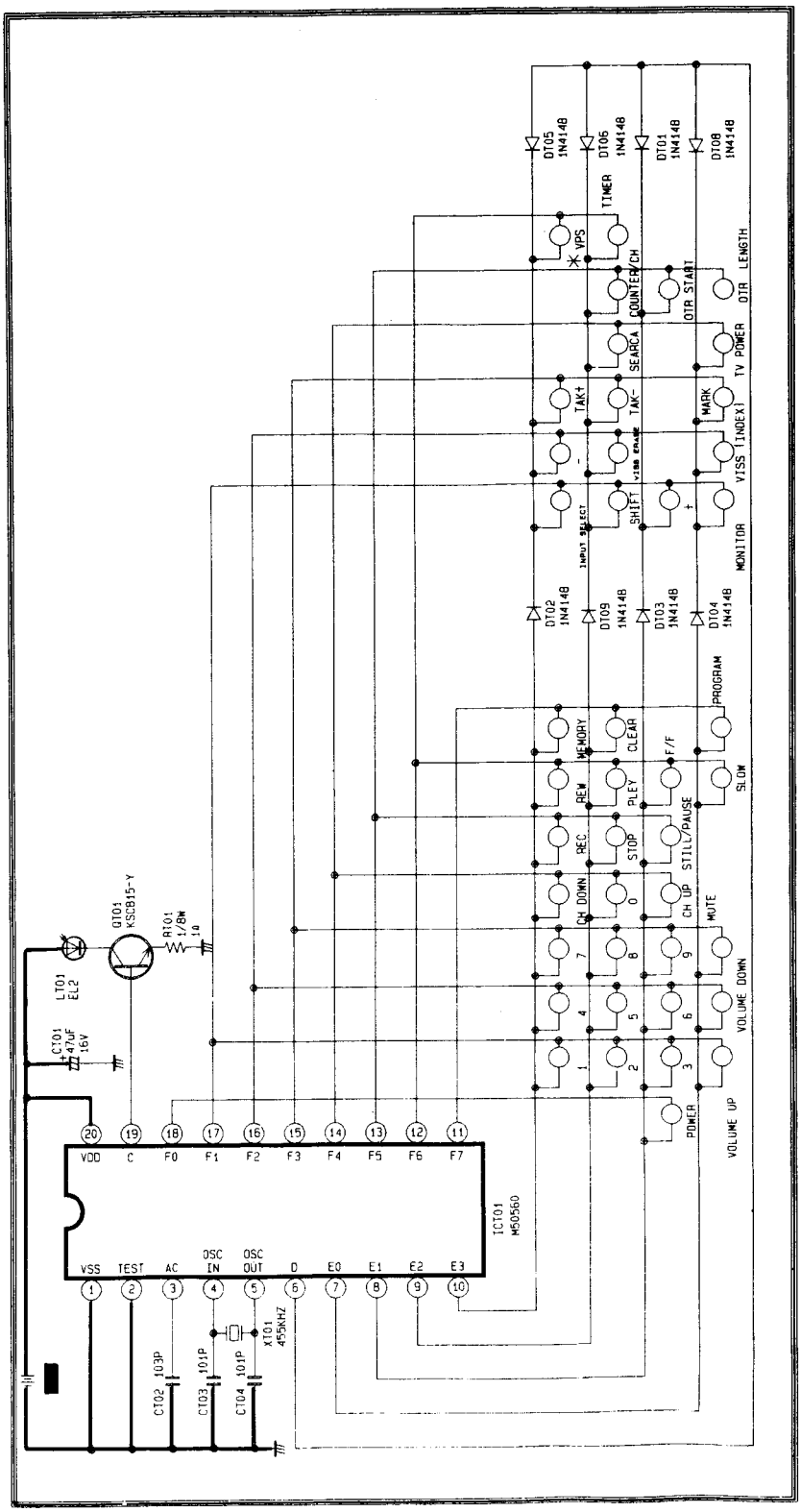
NOTE
Do not use the part number shown on this drawing for ordering. The correct part number is shown in the parts list. And may be slightly different or amended since this drawing was prepared.

10-9. Function



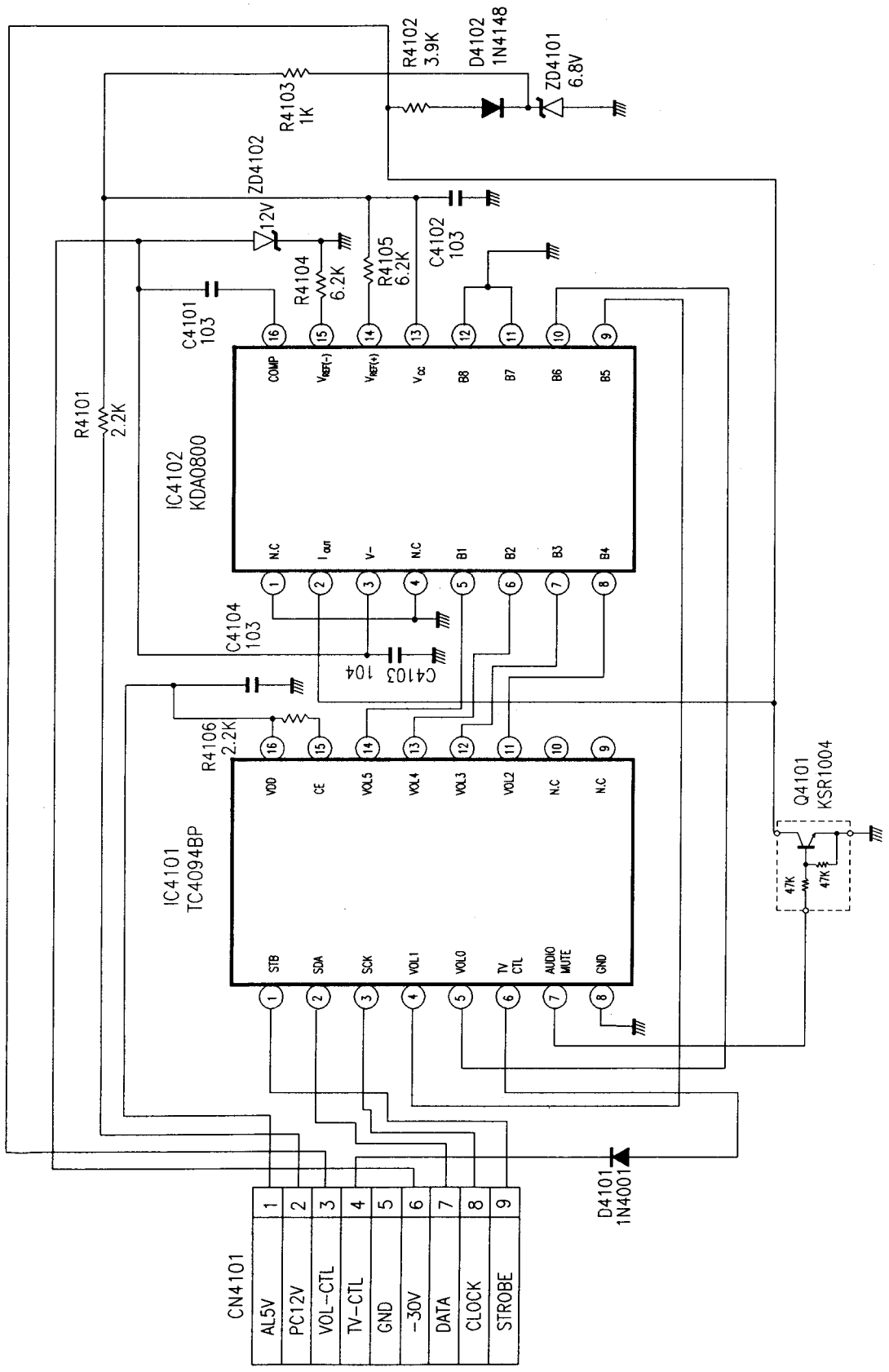
REMOTE CONTROL

10-10. Remote Control



VOLUME CONTROL

10-11. Volume Contnol



11. SEMICONDUCTOR LEAD IDENTIFICATION

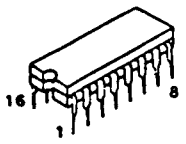
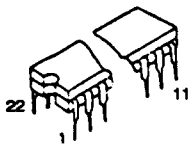
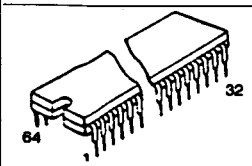
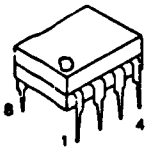
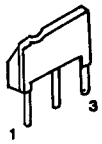
FIGURE	DESCRIPTION	LOCATION NO
DECK JOINT BOARD		
	TC 4021BP	IC 6201
	C 945	Q 6201
PRE-AMP BOARD		
	LA 7320	IC 3101
	A 733	Q 3101
	C 945	Q 3102 Q 3103 Q 3104
SYSTEM CONTROL / TIMER BOARD		
	UPD 759216 ACW-A75	IC 701
	KM 93C46	IC 702
	MN 1280-Q	IC 703
	C 945	Q 701,Q 702

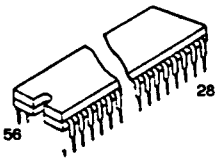
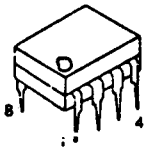
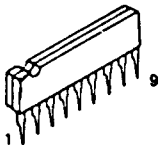
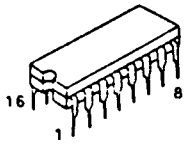
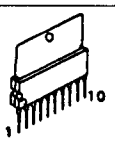
FIGURE	DESCRIPTION	LOCATION NO
SERVO BOARD		
	HD 49748NT	IC 201
	LM 393	IC 202
	LM 358S	IC 203
	TC 4098BP	IC 204,IC 205
	KA 8301	IC 206
	KSR 1003 KSR 1004	Q 205, Q 213 Q 214
	A 733 C 945	Q 207, Q 210 Q 211 Q 209, Q 212
	KSA 928A	Q 215
	KSD 261	Q 216
	KSR 2003	Q 217

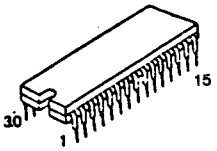
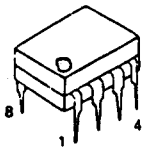
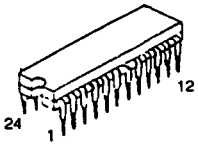
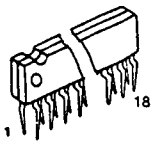
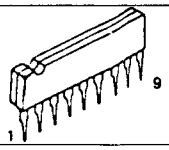
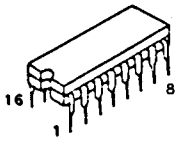
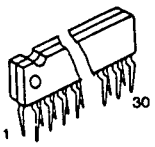
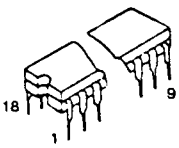
FIGURE	DESCRIPTION	LOCATION NO
VIDEO BOARD		
	LA 7323	IC 3201
	MSM7401RS	IC 3202
	LA 7331	IC 3401
	BA 7025L	IC 3402
	TA 7348P	IC 3501
	KSR 1002	Q 3201 Q 3202 Q 3216
	A 643	Q 3203 Q 3217
	KSR 2004 KSR 2001	Q 2206 Q 3215
	KSR 1004	Q 3414 Q 3416
	KSC 1008	Q 3501

FIGURE	DESCRIPTION	LOCATION NO
TUNER BOARD		
	LA 7545	IC 401
AUDIO BOARD		
	LA 7295	IC 501
	KSC 1008	Q 503 Q 504 Q507
VPS BOARD		
	SAA 4700	IC 6101

1. INSTRUCTION

1. IC LINE UP

DESCRIPTION	LOCATION N	SPECIFICTION	REMARKS
H—OSC, V—RAMP, COIN	IC 101	TDA 8305	
PAL DECODER	IC 501	TDA 3651	
SECAM PROCESSOR	ICS 502	TDA3590A	
VERTICAL IC	IC 301	KA2131	
AUDIO AMP	IC 602	TDA1013A	
S. M. P. S CONTROL	IC 801	TDA 4601	

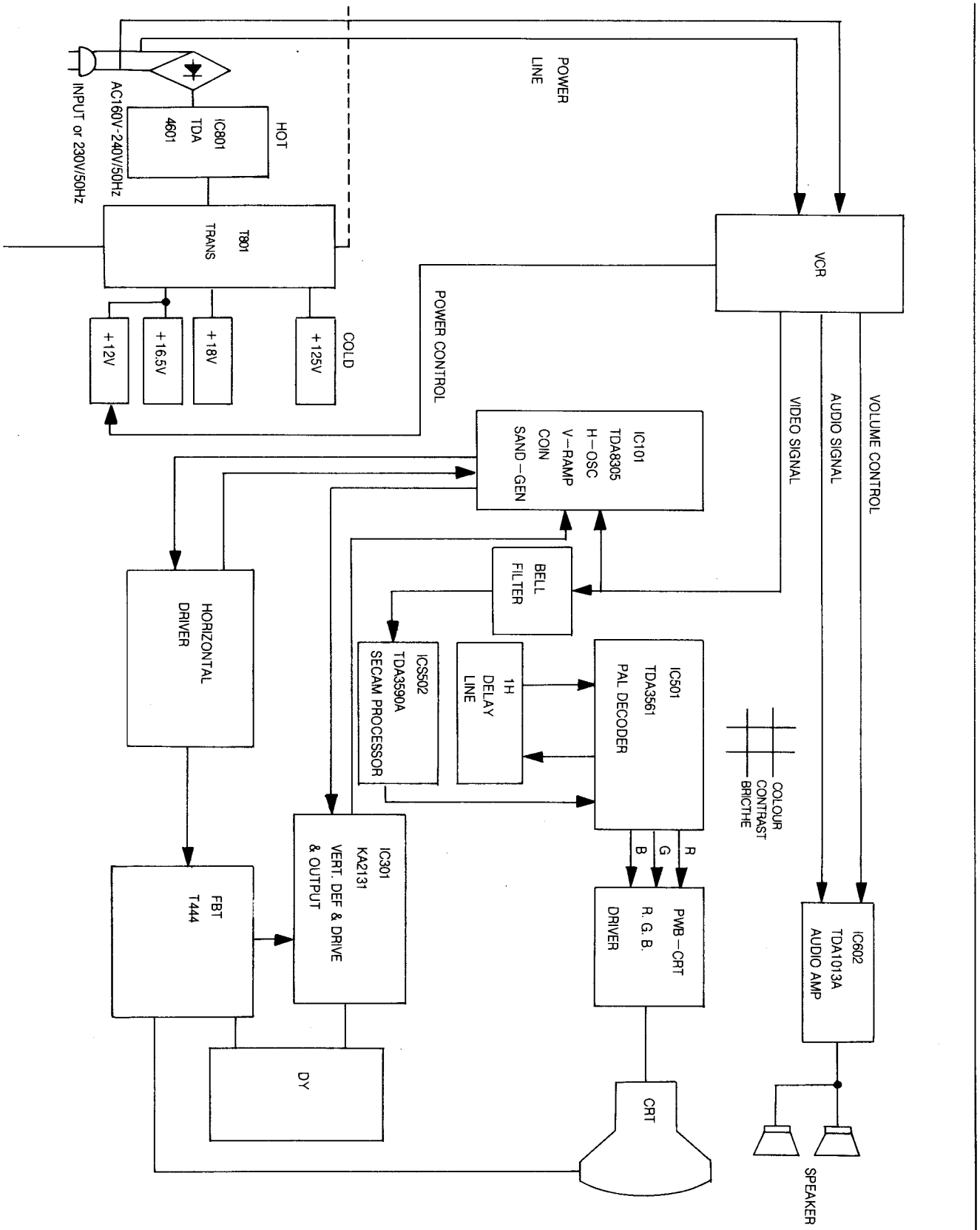
2. Means of Components Number Series

100 series···Tuner/1F/AFT/AGC processing.
200 series···Video/Luminance/Sync processing
300 series···Vertical deflection.
400 series···Horizontal deflection.
500 series···Chroma processing.
600 series···Sound processing.
800 series···AC input, power supply circuits.
900 series···12V regulator, 5V regulator, CRT drive circuits.

3. Abbreviation

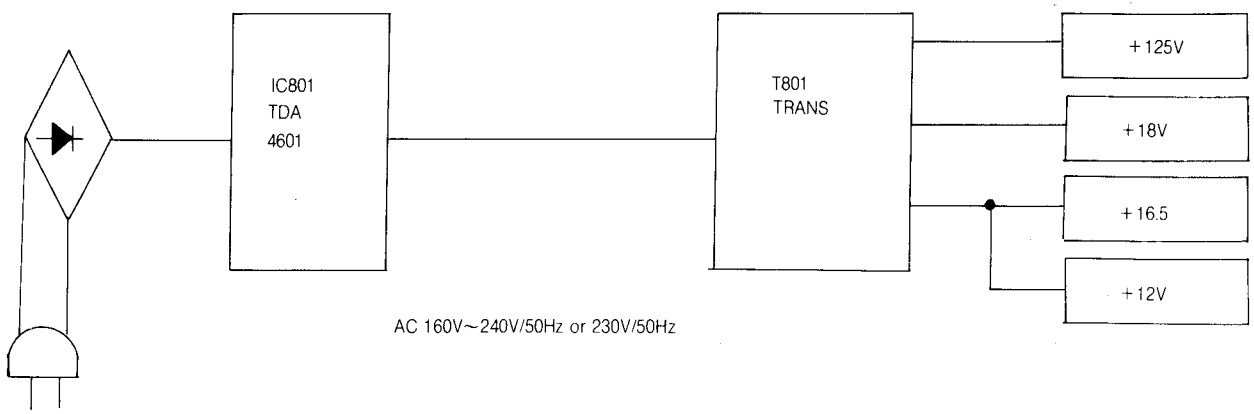
ABCL : Automatic Brightness Contrast Limiting
AC : Alternating Current
ACC : Automatic Color Control
AFC : Automatic Frequency Control
AFT : Automatic Fine Tuning
AGC : Automatic Gain Control
AM : Amplitude Modulation
APC : Automatic Phase Control
APL : Average Picture Level
AVC : Automatic Volume Control
BPF : Band Pass Filter
CTI : Colour Transient Improvement
DAC : Digital Analog Converter
DB : Decibel
DC : Direct Current
DIP : Dual-in-line Package
DY : Deflection York
D/A : Digital to Analog
F. B : Fast Blanking
FBT : Flyback Trans
FM : Frequency Modulation
HDT : Horizontal Drive Trans
IC : Integrated Circuit
IF : Intermediate Frequency
IFT : Intermediate Frequency Trans
LLD : Low Level Detector
LPF : Low Pass Filter
MTS : Multi Television Sound
NFB : Negative Feed Back
NTSC : National Television System Comittee System
NVRAM: Non-Volatile Random Access Memory
OSD : On Screen Display
PAL : Phase Alternationg by Line System
PCM : Pulse Coded Modulation
PIF : Picture Intermediate Frequency
PLL : Pulse Locked Loop
PWM : Pulse Width Memory
RAM : Random Access Memory
RF : Radio Frequency
SAW : Surface Acoustic Wave
SCL : Serial Clock Line
SDA : Serial Data Access Line
SIF : Sound Intermediate Frequency
SOPT : Sound Output Pulse Frequency
SRPP : Shunt Rgulated Push Pull
S/N : Signal Noise
TTE : Triple Transit Echo
VCXO : Voltage Controlled X'tal Oscillation

2. CHASSIS BLOCK-DIAGRAM



3. POWER SUPPLY SECETION(SMPS)

1. BLOCK-DIAGRAM



2. Circuit Description

The TDA 4601 is designed for driving, controlling and protectiong the switching transistor in flyback converter power supplies during start-up, normal and overload operations as well as during disturbed operation. In case of disturbance the drive of the switching transistor is inhibited and a secondary voltage rise is prevented.

1) Start-Up

The start-up procedures(on-mode)include three consecutive operating phases as follows:

1. Build-Up of Internal Reference Voltage

The Internal reference voltage supplies the voltage regulator and effects charging of the coupling electrolytic capacitor connected to the switching transistor. Current consumption will remain at I_9< 3.2 mA with a supply voltage up to V_9 approx. 12V.

2. Enabling of Internal Voltage-Reference Voltage V_i=4V

Simultaneously with V_9 reaching approx. 12 V, an internal voltage becomes available, providing all component elements, with the exception of the control logic, with a thermally stable and overload resistant current supply.

3. Enabling of Control Logic

In conjunction with the generation of the reference voltage, the current supply for the control logic is activated by means of an additional stabilization circuit. The integrated circuit is then ready for operation.

The start-up phase above described are necessary for ensuring the charging of the coupling electrolytic capacitor, which in turn supplies the switching transistor. Only then is it possible to ensure that the transistor switches accurately.

2) Normal Operating Mode/Control Operating Mode

At the input of pin 2 the zero passages of the frequency provided by the feedback coil are registered and forwarded to the control logic. Pin 3 (control input, overload and standby identification) receives the rectified amplitude fluctuations of the feedback coil. The control amplifier operates with an input votage of approx. 2 V and a current of approx. 1.4 mA. Depending on the internal voltage reference, the overload identification limits inconjunction with collector current simulator pin 4 the operating range of the control amplifier. The collector current is simulated by an external RC combination present at pin 4 and internally set threshold voltages. The largest possible collector current applicable to the switching transistor (point of return) increases in proportion to the increased capacitance (10 nF). Thus the required operating range of the control ampliifer is established. The range of control lies between DC voltage clamped at 2 V and a sawtooth-shaped rising AC Voltage, which can vary up to a max. amplitude of 4 V (reference voltage). During secondary load reduction to approx. 20 W, the switching frequency is increased (approx. 50k dHz) at an almost constant pulse duty factor (1:3). During additional secondary load decreases to approx. 1 W, the switching frequency increases to approx. 70 kHz and pulse duty factor to approx. 1:11. At the same time collector peak current is reduced to < 1 A.
The output levels of the control amplifier as well as those of the overload identification and collector current simulator are compared in the trigger and forwarded to the control logic. Via pin 5 it is possible to externally inhibit the operations of the IC. The out-

put at pin 8 will be inhibited when voltages of $\leqq \frac{V_{REF}}{2}$ -0.1 V

Flipflops for controlling the base current amplifier and the base current shut-down are set in the control logic depending on the start-up circuit, the zero passage identification as well as on the enabling by the trigger. The base current amplifier forwards the sawtooth shaped V_4 voltage to the output of pin 8. A current feedback with an external resistor(R=o.68 Ω) is present between pin 8 and pin 7. The applied value of the resistor determines the max. amplitude of the base driving current for the switching transistor.

3) Protective Operating Mode

The base current shut-down activated by the control logic clamps the output of pin 7 to 1.6 V. As a result, the drive of the switching transistor is inhibited. This protective measure is enabled if the supply voltage at pin 9 reaches a value ≤6.7 V or if voltages of $\leq \frac{V_{REF}}{2}$ 0.1 V are present at pin 5.

In case of short-circuits occurring in the secondary windings of the switched-mode power supply, the integrated circuit continuously monitors the fault conditions. During secondary, completely load-free operation only a small pulse duty factor is set. As a result the total power consumption of the power supply is held at N=6···10 W during both operating modes. After the output has been inhibited for a voltage supply of ≤ 6.7 V, the reference voltage (4 V)is switched diff if the voltage supply is further reduced by ΔV_9 =0.6 V.

Protective Operating Mode at Pin 5 in Case of Disturbance

The protection against disturbances such as primary undervoltages and/or secondary over-voltages (e.g. by changes in the component parameters for the switched-mode power suppy) is realized as follows:

Protective Operating Mode with Continuous Fault Condition Monitoring

In case of disturbance the output pulses at pin 8 are inhibited by falling below the protective threshold V_5 with a typical value of V_1 /2. As a result current consumption is reduced ($I_9 \geqq$14mA at V_9=10V)

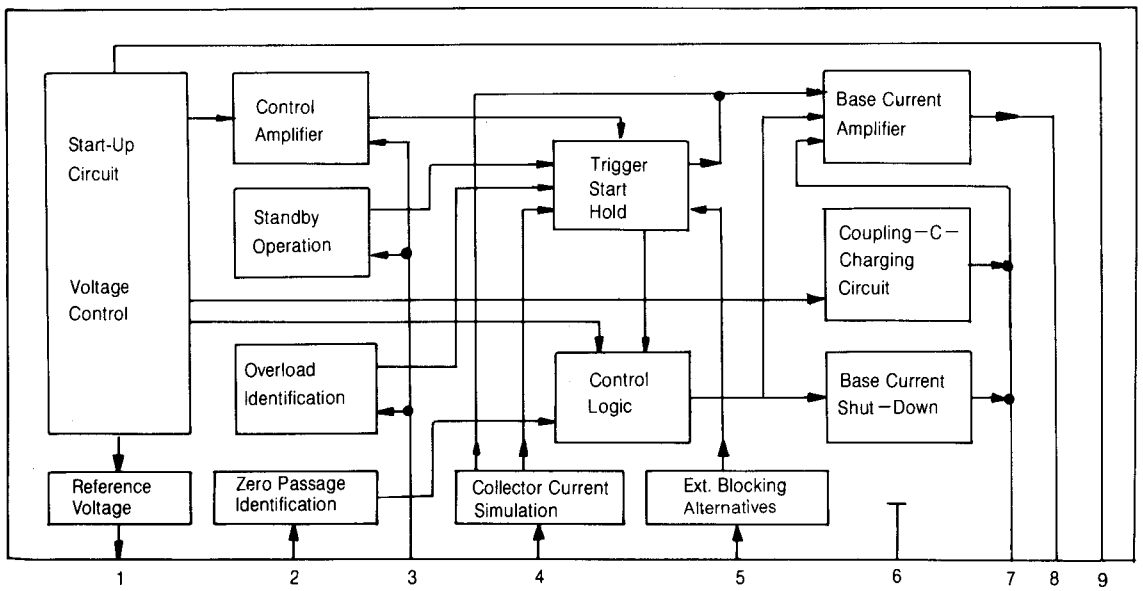
With a corresponding high-impedance start-up resistor, supply voltage V_9 will fall below the minmum shut-down threshold (5.7 V)for reference voltage V_1. V_1 will be switched off and current consumption is further reduced to $I_9 \leq$ 3.2mA at $V_9 \leq$ 10V.

Because of these reductions in current consumption, the supply voltage can rise again to reach the switch-on threshold of $V_9 \geq$ 12.3 V. The protective threshold at pin 5 is released and the power supply is again ready for operation.

In case of continuing problems of disturbance ($V_5 \leq V_1$ /2-0.1) the switch-on mode is interrupted by the periodic protective operating mode described above, i.e. pin 8 is inhibited and V_9 is falling, etc.

3. POWER IC SPECIFICTION (TDA4601)

1) BLOCK-DIAGRAM

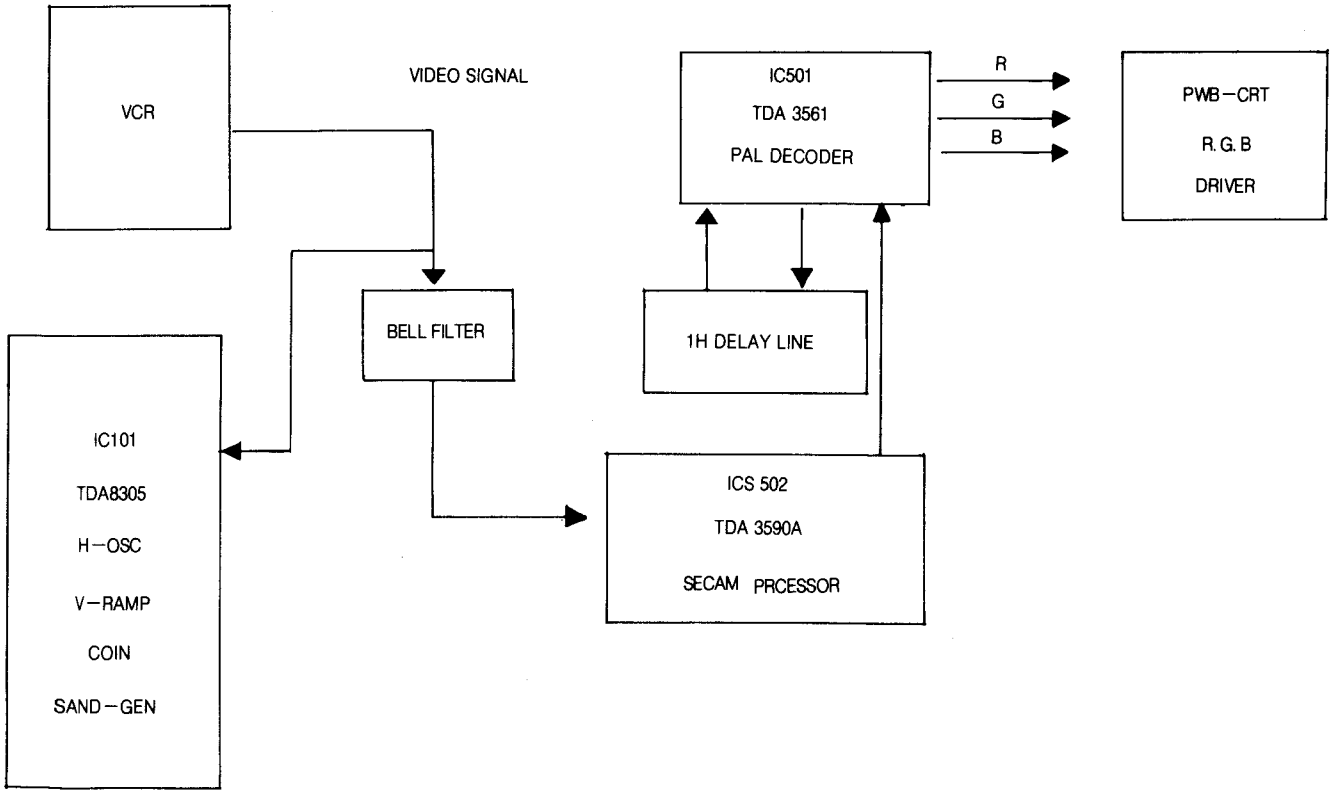


2) PIN FUNCTIONS

Pin No.	Function
1	V_{REF}output
2	Zero passage identification
3	Input control amplifier, overload amplifier
4	Collector current simulation
5	Connection for additional protective circuit
6	Ground (rigidly connected to substrate mounting plate)
7	DC output for charging coupling capacitor
8	Pulse output-driving of switching transistor
9	Supply voltage

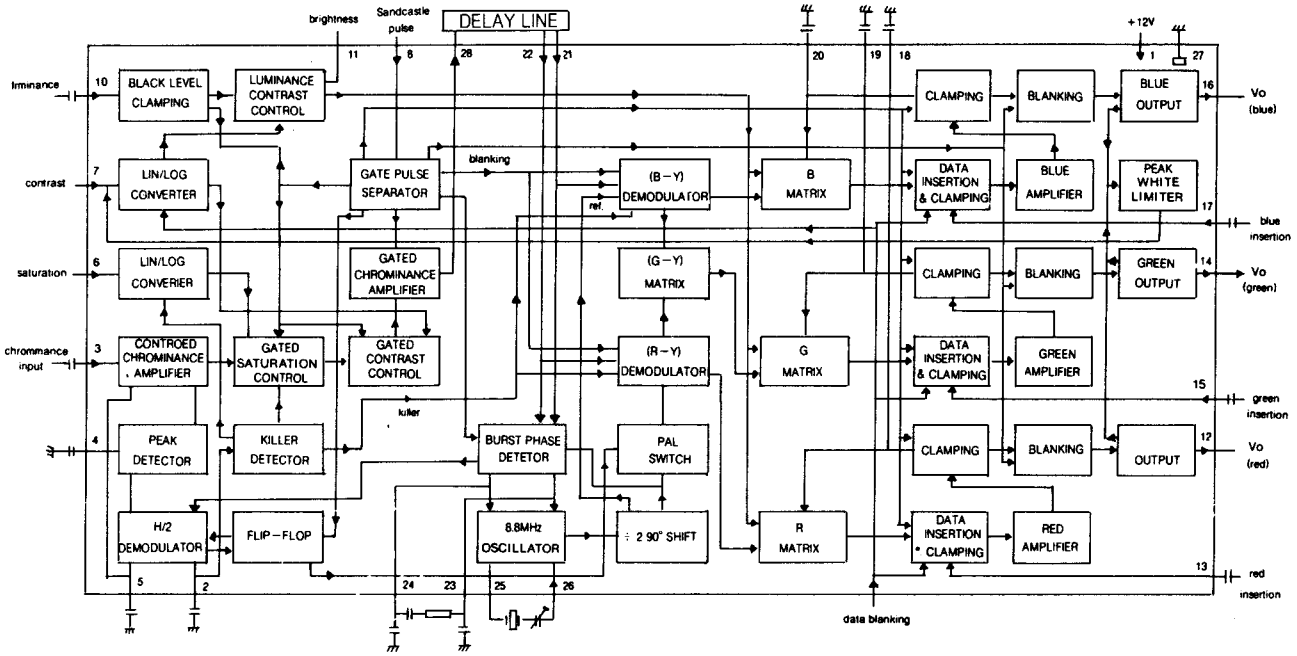
4. CHROMA & VIDEO SECTION

1. BLOCK-DIAGRAM



2. PAL DECODER SECTION (TDA3651A)

1) BLOCK-DIAGRAM



2) GENERAL DESCRIPTION

The TDA3561A is a decoder for the PAL colour television standard. It combines all functions required for the identification and demodulation of PAL signals. Furthermore it contains a luminance amplifier, an RGB-matrix and amplifier. These amplifiers supply output signals up to 5 V peak-to-peak (picture information)enabling direct drive of the discrete output stages. The circuit also contains separate inputs for data insertion, analogue as well as digital, which can be used for text display systems (e.g. (Teletext/broadcast antiope), channel number display, etc. Additional to the TDA3560, the circuit includes the following features:

- The peak white limiter is only active during the time that the 9.3V level at the output is exceeded. The start of the limiting function is delayed by one line period. This avoids peak white limiting by test patterns which have abrupt transitions from colour to white signals.
- The brightness control is obtained by inserting a variable pulse in the luminance channel. Therefore the ratio of brightness variation and signal amplitude at the three outputs will be identical and independent of the difference in gain of the three channels. Thus discolouring due to adjustment of contrast and brightness is avoided.
- Improved suppression of the internal RGB signals when the device is switched to external signals, and vice versa.
- Non-synchronized external RGB signals do not disturb the black level of the internal signals.
- Improved suppression of the residual 4.4 MHz signal in the RGB output stages.
- Cascoded stages in the demodulators and burst phase detector minimize the radiation of the colour demodulator inputs.
- High current capability of the RGB outputs and the chrominance output.

3) QUICK REFERENCE DATA

Supply voltage	V_{1-27}	type. 12 V
Supply current	I_1	typ. 85 mA
Luminance input signal (peak-to-peak value)	$V_{10-27\,(p-p)}$	typ. 0.45 V
Chrominance input signal (peak-to-peak value)	$V_{3-27\,(p-p)}$	55 to 1100 mV
Data input signals (peak-to-peak value)	$V_{13,15,17-27\,(p-p)}$	typ. 1V
RGB output signals at nominal contrast and saturation (peak-to-peak value)	$V_{12,14,16-27\,(p-p)}$	typ. 5.25V
Contrast control range		typ. 20 dB
Saturation control range		min. 50 dB
Input voltage for data insertion	V_{9-27}	min. 0.9 V
Blanking input voltage	V_{8-27}	typ. 1.5 V
Burst gating and black-level gating input voltage	V_{8-27}	typ. 7 V

4) APPLICATION INFORMATION (PIN DESCR IPTION)

The function is described against the corresponding pin number.

1 +12V power supply

The circuit gives good operation in a supply voltage range betweeen 8 and 13.2 V provided that the supply voltage for the controls is equal to the supply voltage for the TDA3561A. All signal and control levels have a linear dependency on the supply voltage. The current taken by the device at 12 V is typically 85 mA. It is linearly dependent on the supply voltage.

2. Control voltage for identification

This pin requires a detection capacitor of about 330 nF for correct operation. The voltages available under various signal conditions are given in the specification.

3. Chrominance input

The chroma signal must be A. Ccoupled to the input. Its amplitude must be between 55 mV and 1100 mV peak-to-peak (25mV to 500 mV peak-to-peak burst signal). All figures for the chroma signals are based on a colour bar signal with 75% saturation, that is the burst-to-chroma ratio of the input signal is 1 : 2. 25.

4. Reference voltage A.C.C. detector

This pin must be decoupled by a capacitor of about 330 nF. The voltage at this pin is 4.9V .

5. Control voltage A.C.C.

The A.C.C. is obtained by synchronous detection of the burst signal followed by a peak detector. A good noise immunity is obtained in this way and an increase of the colour for weak input signals is prevented. The recommended capacitor value at this pin is 2.2μF.

6. Saturation control

The saturation control range is in excess of 50 dB. The control voltage range is 2 to 4 V. Saturation control is a linear function of the control voltage.
When the colour killer is active, the saturation control voltage is reduced to a low level if the resistance of the external saturation control network is sufficiently high. Then the chroma amplifier supplies no signal to the demodulator. Colour switch-on can be delayed by proper choice of the time constant for the saturation control setting circuit.
When the saturation control pin is connected to the power supply the colour killer circuit is overruled so that the colour signal is visible on the screen. In this way it is possible to adjust the oscillator frequency without using a frequency counter (see also pins 25 and 26).

7. Contrast control

The contrast control range is 20 dB for a control voltage change from +2 to + 4V. Contrast control is a linear function of the control voltage. The output signal is suppressed when the control voltage is 1V or less. If one or more output signals surpasses the level of 9 V the peak white limiter circuit becomes active and reduces the output signals via the contrast control by discharging C2 via an internal current sink.
becomes active and reduces the output signals via the contrast control by discharging C2 via an internal current sink.

8. Sandcastle and field blanking input

The output signals are blanked if the amplitude of the input is between 2 and 6.5 V. The burst gate and clamping circuits are activated if the input pulse exceeds a level of 7.5 V.
The higher part of the sandcastle pulse should start just after the sync pulse to prevent clamping of video signal on the sync pulse. The width should be about 4 μs for proper A. C. C. Operation.

9. Video-data switching

The insertion circuit is activated by means of this input by an input pulse between 1 V and 2 V. In that condition, the internal RGB signals are switched off and the inserted signals are supplied to the output amplifiers. If only normal operation is wanted this pin should be connected to the negative supply. The switching times are very short ($\ll$ 20 ns) to avoid coloured edges of the inserted signals on the screen.

10. Luminance signal input

The input signal should have a peak-to-peak amplitude of 0.45 V (peak white to sync) to obtain a black-white output signal of 5 V at nominal contrast. It must be A. C-coupled to the input by a capacitor of about 22nF. The signal is clamped at the input to an internal reference voltage.
A 1 kΩ luminance delay line can be applied because the luminance input impedance is made very high. Consequently the charging and discharging currents of the coupling capacitor are very small and do not influence the signal level at the input noticeably. Additionally the coupling capacitor value may be small.

11. Brightness control

The black level of the RGB outputs can be set by the voltage on this pin (see Fig. 5). The black level can be set higher than 4 V however the available output signal amplitude is reduced (see pin 7).
Brightness control also operates on the black level of the inserted signals.

12, 14, 16. RGB outputs

The output circuits for red, green and blue are identical. Output signals are 5.25 V (R, G and B) at nominal input signals and control settings. The black levels of the three outputs have the same value.
The blanking level at the outputs is 2.1 V. The peak white level is limited to 9.3 V. When this level exceeded the output signal amplitude is reduced via the contrast control (see pin 7).

13, 15, 17. Inputs for external RGB signals

The external signals must be A. C-coupled to the inputs via a coupling capacitor of about 100nF.
Source impedance should not exceed 150 Ω. The input signal required for a 5V peak-to-peak output signal is 1 V peak-to-peak. At the RGB outputs the black level of the inserted signal is identical to that of normal RGB signals. When these inputs are not used the coupling capacitors have to be connected to the negative supply.

18, 19, 20. Black level clamp capacitors

The black level clamp capacitors for the three channels are connected to these pins. The value of each capacitor should be about 100 nF.

21, 22. Inputs (B-Y) and (R-Y) demodulators

The input signal is automatically fixed to the required level by means of the burst phase detector and A.C.C. generator which are connected to pin 21 and 22. As the burst (applied differentially to those pins) is kept constant by the A.C.C., the colour difference signals automatically have the correct value.

23, 24. Burst phase detector outputs

At these pins output of the burst phase detector is filtered and controls the reference oscillator. An adequate catching range is obtained with the time constants given in the application circuit (see Fig. 6).

25, 26. Reference oscillator

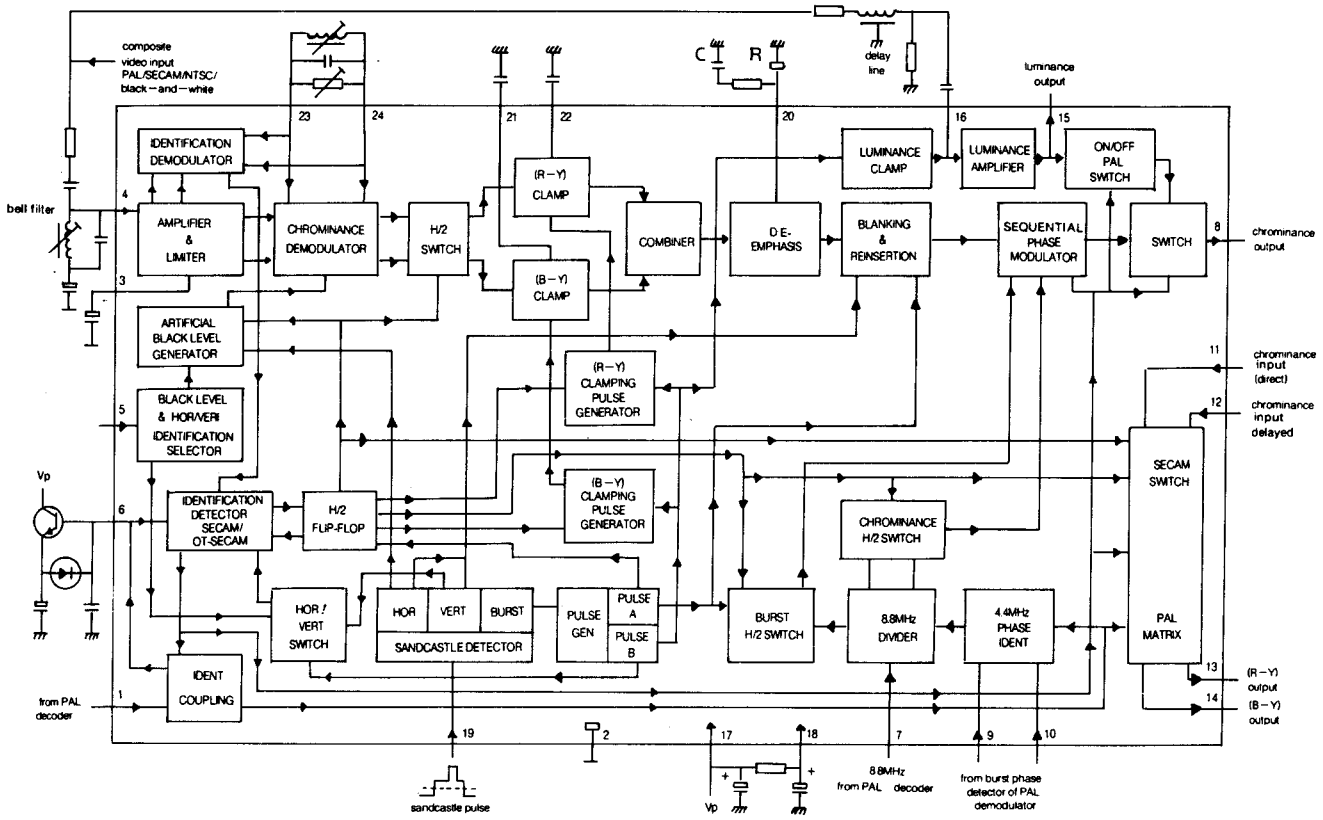
The frequency of the oscillator is adjusted by the variable capacitor C1. For frequency adjustment interconnect pin 21 and pin 22. The frequency can be measured by connecting a suitable frequency counter to pin 25.

28. Output of the chroma amplifier

Both burst and chroma signals are available at the output. The burst-to-chroma ratio at the output is identical to that at the input for nominal control settings. The burst signal is not affected by the controls. The amplitude of the input signal to the demodulator is kept constant by the A.C.C.
Therefore the output signal at pin 28 will depend on the signal loss in the delay line.

3. SECAM PROCESSOR CIRCUIT SECTION (TDA3590A)

1) BLOCK-DIAGRAM



2) GENERAL DESCRIPTION

The TD3590A processor circuit converts SECAM signals into sequential phase-modulated (quasi-PAL) signals. It combines all the functions of the TDA3590, TDA3591 and TDA3591A to provide a complete SECAM processor system. The circuit is intended for use in onjunction with TDA3560, TDA3561, TDA3562A or TDA3566 to provide SECAM/PAL/NTSC/black-and-white processor combinations.

Features

- **Limiter/amplifier for chrominance signal**
- **SECAM demodulator**
- **Clamp circuits and de-emphasis for colour difference signals**
- **Modulator to convert colour difference signals into sequential, phase-modulated signals**
- **Identification circuit for horizontal, vertical or combined horizontal and vertical SECAM identification.**
- **Divider circuit to provide 4.4 MHz carrier from 8.8 MHz signals generated in TDA3560/61A/62A/66**
- **Sandcastle pulse detector**
- **SECAM switch and PAL matrix**
- **Video amplifier**
- **Pin compatibility with TDA3590, TDA3591 and TDA3591A when application requires SECAM ident priority (does not apply with PAL ident priority)**

3) QUICK REFERENCE DATA

Supply voltage	$V_p=V_{17-2}$	typ.	12V
Supply current	$I_p=I_{17}$	typ.	100mA
Chrominance amplifier and demodulator			
Input signal PAL (peak-to-peak value)	$V_{4-2\,(p-p)}$	typ.	550mV
Input signal SECAM (peak-to-peak-value)	$V_{4-2\,(p-p)}$	typ.	100 mV
Output signal PAL (peak-to-peak-value)			
at $V_{16(p-p)}$ =1.2V	$V_{8-2\,(p-p)}$	typ.	900 mV
Output signal SECAM (peak-to-peak value)	$V_{8-2\,(p-p)}$	typ.	500mV
Identification			
Input voltage range for horizontal identification (pin 5)	V_{5-2}	0 to	8 V
Input voltage range for vertical identification (pin 5)	V_{5-2}	10.5 to	12.0 V
Voltage at pin 6 for PAL	V_{6-2}	typ.	10.2 V
Voltage at pin 6 for SECAM	V_{6-2}	typ.	7.0 V
Sandcastle pulse detector			
Vertical blanking level	V_{19-2}	typ.	1.5 V
Horizontal blanking level	V_{19-2}	typ.	3.5 V
Burst gating level	V_{19-2}	typ.	7.2 V
Luminance pulse amplifier			
Luminance input signal (peak-to-peak value)	$V_{16-2\,(p-p)}$	typ.	1.2 V
Luminance output signal (peak-to-peak value)	$V_{15-2\,(p-p)}$	typ.	3.0 V
PAL matrix and SECAM switch			
Burst signal amplitude (peak-to-peak value)	$V_{11-12-2\,(p-p)}$	typ.	60 mV
Amplification for PAL		typ.	0.5 dB
Amplification for SECAM		typ.	6 dB

PACKGE OUTLINE

24-lead DIL; plastic (with internal heat spreader) (SOT-101B).

4) PIN DESCRIPTION

1. Identification coupling input for PAL/not-PAL identification using half the saturation voltage of the PAL decoder.
2. Ground.
3. Limiter feedback.
4. SECAM video input.
5. Identification selection input using a D.C. level to preset the identification mode of horizontal/vertical detection + black level clamping/insertion.
6. Storage circuit input to SECAM/not-SECAM identification detector.
7. Divider circuit input of 8.8 MHz from the PAL decoder.
8. Chrominance signal output comprising PAL or processed SECAM (quasi-PAL).
9. Carrier signal phase identification input from the burst phase detector of the PAL decoder.
10. As for pin 9
11. Direct chrominance input to SECAM switch/PAL matrix.
12. Delayed chrominance input to SECAM switch/PAL matrix.
13. Colour difference output (R-Y)
14. Colour difference output (B-Y).
15. Luminance output.
16. Luminance/PAL input.
17. Positive supply voltage (Vp).
18. Decoupled positive supply voltage.
19. Three-level sandcastle pulse input.
20. De-emphasis circuit connection.
21. Storage capacitor connection for (B-Y) clamp.
22. Storage capacitor connection for (R-Y) clamp.
23. connection for reference tuned circuit for SECAM chrominance and identification demodulators.
24. As for pin 23.

5) FUNCTIONAL DESCRIPTION

Demodulation

The chrominance and identification demodulators of the TDA3590A both share the same reference tuned circuit (pins 23 and 24). The identification circuit automatically detects whether the incoming signal is SECAM or not-SECAM.
When the incoming signals are not-SECAM (PAL/NTSC/black-and-white)they are diverted via pin 16 to the chrominance output at pin 8 and no sig-

nal demodulation takes place. The delay line connected to pin 16 delays the signals to equalize the delay of the SECAM processor circuitry. When SECAM signals are received the PAL signal path is switched off.
Incoming SECAM signals are applied to pin 4 via an external bell filter. The signals are amplified, limited and then demodulated. The limiters give optimum if. interference suppression. Only one demodulator is necessary as the colour difference signals are available sequentially. After demodulation the colour difference signals are separated by an H/2 switch and then applied to (R-Y) and (B-Y)clamp circuits where the black levels are clamped to the same D.C. level. The optimum black level can be obtained at the end of the horizontal burst, so the timing of the (R-Y) and (B-y)clamp is determined by the last 1.45 μs of the burst gate pulse.
The two colour difference signals are combined again after clamping and then applied to the modulator via de-emphasis, blanking and reinsertion circuits.
The ratio of (R-Y) to (B-Y) at the de-emphasis output (pin20) is 1.78. The external de-emphasis components of R=1 kΩ and C=470 pF give a spread at the internal de-emphasis network $<$ 20%.

5. VERTICAL SECTION

1. TV VERTICAL OUTPUT CIRCUIT

The KA2131 is a monolithic integrated circuit designed for vertical output stage in color television receivers.

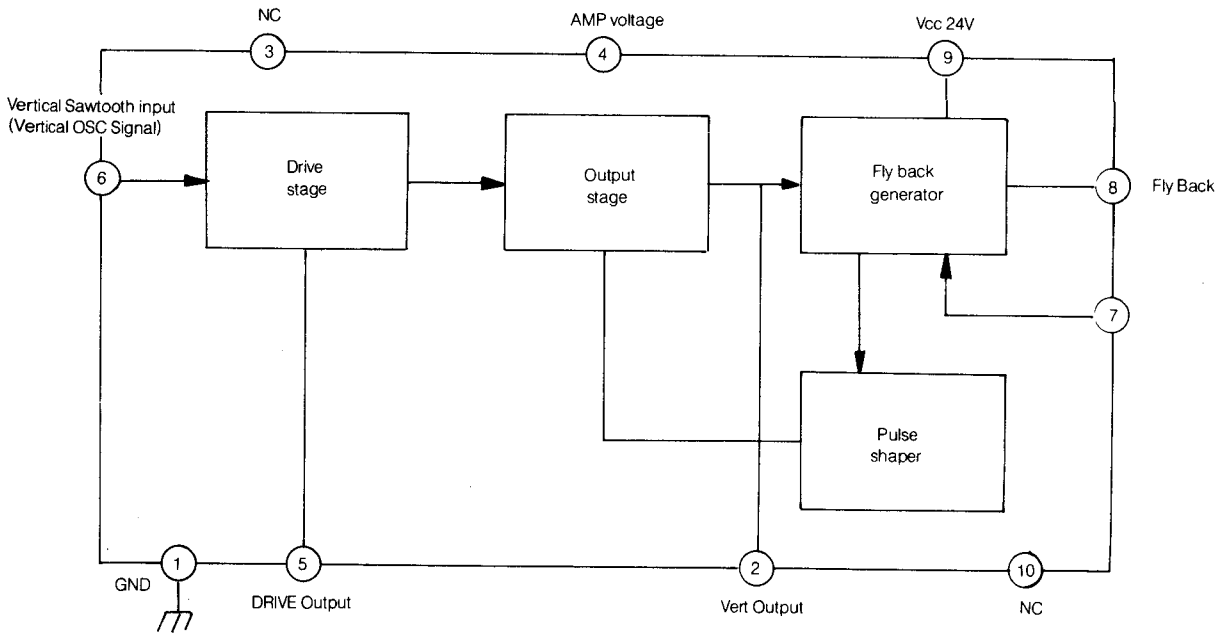
2. FUNCTIONS

- Driver stage.
- Output stage.
- Flyback generator.
- Pulse shaper.

3. FEATURES

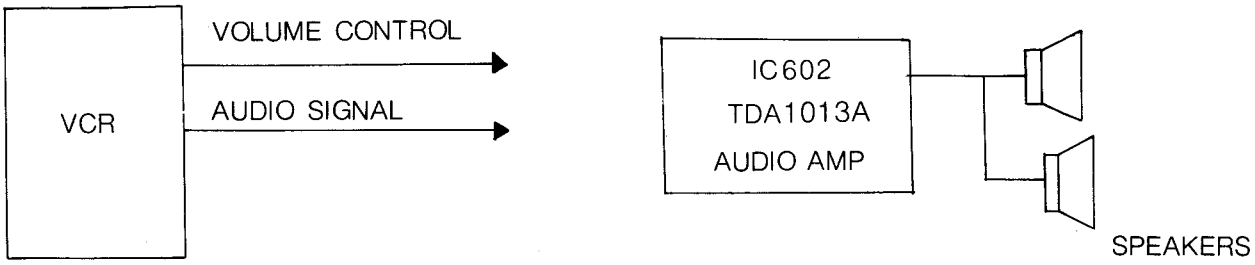
- Low power consumption, direct deflection coil driving capability (Flyback voltage two times as high as supply voltage is supplied during flyback period only).
- High breakdown voltage : 60V.

4. BLOCK DIAGRAM



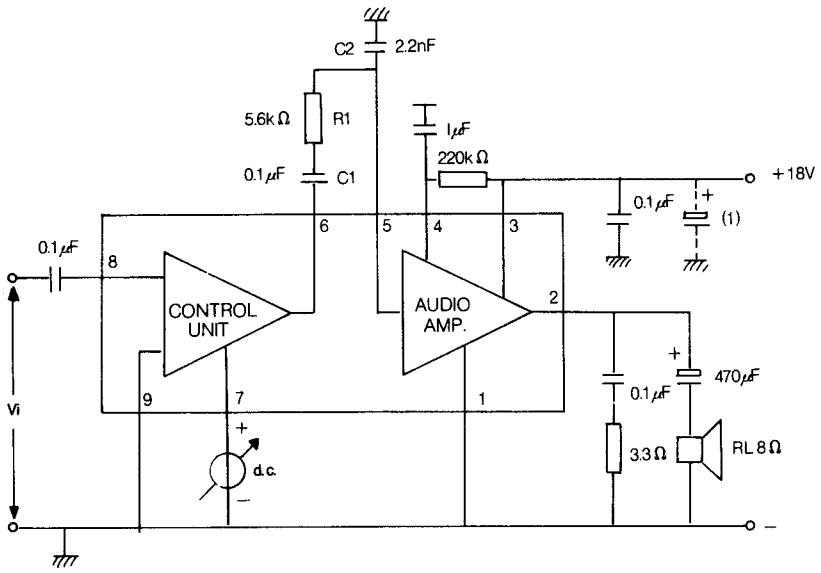
6. AUDIO SECTION

1. BLOCK-DIAGRAM



2. SEMICONDUCTOR SPECIFICATION (TDA1013A)

1) BLOCK-DIAGRAM



Basic application diagram also used as test circuit with R1=5.1kΩ and C1=22nF.

2) GENERAL DESCRIPTION

The TDA1013A is a monolithic integrated audio amplifier circuit with D.C volume control in a 9-lead single in-line (SIL) plastic package. The wide supply voltage range makes this circuit very suitable for applications in mains-fed apparatus such as television receivers and record players.
The D.C volume control stage has a logarithmic control characteristic with a range of more than 80 dB; control can be obtained by means of a variable D.C voltage between 3.5 and 8 V.
The audio amplifier has a well defined open loop gain and a fixed integrated closed loop gain. This offers an optimum in number of external components, performance and stability.
The SIL package(SOT-110B) offers a simple and low-cost heatsink connection.

3) QUICK REFERENCE DATA

Supply voltage range	Vp	15 to 35 V	
Repetitive peak output current	I_{ORM}	max.	1.5A
Total sensitivity (d.c control at max. gain)			
for Po=2.5W	Vi	typ.	55 mV
Audio amplifier			
Output power at d_{tot} =10%			
Vp=18V ; RL=8 Ω	Po	typ.	4.5 W
Total harmonic distortion at Po=2.5W ; RL=8 Ω	d_{tot}	typ.	0.5 %
Sensitivity for Po=2.5W	Vi	typ.	125 mV
D. C. volume control unit			
Gain control range	ϕ	>	80 dB
Signal handling at d_{tot} < 1 %			
(D.C control at 0 dB)	Vi	>	1.2 V
Sensitivity for Vo=125mV at max. voltage gain	Vi	typ.	55 mV
Input impedance (pin 8)	|Zi|	typ.	250 k Ω

4) RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)			
Supply voltage	Vp	max.	35 V
Non-repetitive peak output current	I_{OSM}	max.	3 A
Repetitive peak output current	I_{ORM}	max.	1.5 A
Storage temperature	Tstg	−55 to + 150 ℃	
Crystal temperature	Tj	−25 to + 150 ℃	
Total power dissipation	see derating curve Fig. 2		

5) HEATSINK DESIGN

Assume Vp=18V ; Ri=8 Ω ; Timb=60℃(max); Tj=150℃(max); for a 4 W application into an 8 Ω load, the maximum dissipation is about 2.5W. The thermal resistance from junction to ambient can be expressed as;

$$R_{th\ j\text{-}a} = R_{th\ j\text{-}tab} + R_{th\ tab\text{-}h} + R_{th\ h\text{-}a} = \frac{T_{jmax} - T_{ambmax}}{P_{max}} = \frac{150-60}{2.5} =$$

36K/W.

Since Rth j-tab=9K/W and Rth tab-h=1K/W, Rth h-a=36−(9+1)=26K/W.

7. INSTALLATION AND SERVICE ADJUSTMENTS

1. GENERAL INFORMATIONS

All adjustments are thoroughly checked and corrected when the receiver leaves the factory. Therefore, the receiver should operate normally and produce proper colour and B/W picture upon installation.

However, minor service adjustments may be required depending on the particular location in which the receiver is operated. This receiver is shipped completely in carboard carton. Carefully draw out the carton and remove all packing materials. Plug the power cord into a convenient two pin power outlet. Turn on the receiver and adjust the fine tuning for the best picture detail.

Check and adjust all the customer controls such as BRIGHTNESS, CONTRAST and COLOUR Controls to obtain the natural colour or B/W picture.

2. AUTOMATIC DEGAUSSING

A degaussing coil is mounted around the picture tube so that external degaussing after moving the receiver is normally unnecessary, providing the receiver is properly degaussing upon installation. The degaussing coil operates for about 1 second after the power to the receiver is switched ON.
If the set is moved or faced in a different direction, the power switch must be switched off at least 10 minutes in order that the automatic degaussing circuit is operated properly.
Should the chassis or parts of the cabinet become magnetized and cause the poor colour purity, use an external degaussing coil. Slowly move the degaussing coil around the face-place of the picture tube, the sides and the rear of the receiver and slowly withdraw the coil to distance of about 2 m before disconnecting it from AC source. If colour shading still persists, perform the COLOUR PURITY ADJUSTMENT and CONVERGENCE ADJUSTMENTS procedures as mentioned later.

3. HIGH VOLTAGE CHECK

Caution: There is no HIGH VOLTAGE ADJUSTMENT on this chassis. But B+power must be adjusted in + 125V under the full colour bar pattern and the normal picture control level.

1) Connect an accurate high voltage meter to the second anode of the picture tube.
2) Turn on the receiver. Set the BRIGHTNESS and CONTRAST control to minimum (zero beam).
3) The high voltage should be measured less than 25KV.
4) Rotate the BRIGHTNESS and CONTRAST controls to both extremes to be sure that the high voltage does not exceed the limit of 25.5KV under any conditions.

4. B + (+125V) ADJUSTMENT

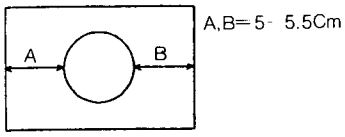
1) Receive the lion-head pattern.
2) Set the Bright and Contrast condition to maximum.
3) Connect Digital voltmeter to R821.
4) Adjust the VR801 to + 125V.

5. HORIZONTAL OSCILLATOR ADJUSTMENT

If there is an indication of unstable horizontal sync, adjust the HORIZONTAL HOLD control (VR401)to remove the condition. When you adjust the Horizontal Hold control, you should short TP25 and GND for the H-oscillator adjustment.

6. HORIZONTAL PHASE ADJUSTMENT

If you want to move the center of picture,

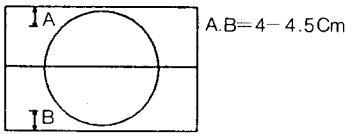


(STANDARD)

adjustment HORIZONTAL phase control (VR402).

7. VERTICAL HEIGHT ADJUSTMENT

The SIZE control (VR301) on the main board changes the size of the picture, having an equal effect on the top and bottom (Lion Head Pattern).



(STANDARD)

8. VERTICAL LINEARITY ADJUSTMENT

1) Receive the Lion-head Pattern.
2) Make the Pattern to be one circle by using the vertical Linearity VR(VR302).
3) Make the two semicircles of the circle to be same type.

9. VIDEO INPUT LEVEL ADJUSTMENT

1) Receive the color bar pattern with color bar pattern generator.
2) Connect the oscilloscope probe with TPA and TPB.
3) Adjust the video level VR(VR101) for 2.1Vp.p amplitude on oscilloscpe.

10. FOCUS ADJUSTMENT

1) Set the Bright and Contrast condition to maximum.
2) Adjust FOCUS Control on FBT for well defined scanning lines in the centre area of the screen.

11. APC ADJUSTMENT

1) Receive the colour bar pattern.
2) Connect TP23 to TP24 with jumper (TDA3651A).
3) Pin 1 to 6 with short (TDA3651A)
4) Control the Trimmer CV101 on the main PCB to get the colour.

12. COLOUR PURITY ADJUSTMENT

Note: Before attempting any purity adjustments, the receiver should be operated for at least fifteen minutes. The purity adjustment requires R ubber Wedge kit.

1) Demagnetize the picture tube and cabinet by using a degaussing coil.
2) Turn the CONTRAST and BRIGHTNESS controls to maximum.
3) Receiver the green colour pattern.
4) Loosen the clamp holding the yoke, and slide the yoke backward or forward to provide the vertical green belt (zone) in the picture screen.
5) Remove the Rubber Wedges.
6) Rotate and spread the tabs of the purity magnet (See Fig. 4) around the neck of the picture tube un-

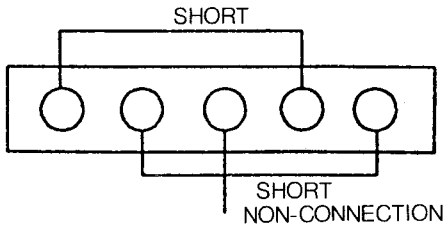
til a green belt is obtained in the centre of the screen.
And at the same time, centre the raster vertically by adjusting th magnet.

7) Move the yoke slowly forward or backward until a uniform red screen is obtained. Tighten the clamp screw.
8) Check the purity of the red and bule raster.
9) Tighten the clamp screw of the yoke temporarily.
10) Obtain a white raster referring to "CRT WHITE BALANCE ADJUSTMENT".
11) Proceed with the convergence adjustment.

13. SCREEN VOLTAGE & WHITE BALANCE ADJUSTMENT

1) PREPARATION

a. Operate the receiver at least 20 minutes before attempting the white balance adjustment.
b. Connect A.C. line and the receiver power switch sets in "ON" position.
c. Receive a black and a white signals (Lion head pattern is better.)
d. Set colour control to the center position.
e. Set the brightness to center and controls to Max.
f. Set the red, blue and green drive controls to the mechanical center position.
g. Set the blue and green drive controls to the machanical center position.
h. Set the screen VR control on FBT to the minimum position (fully counter-clockwise).
i. Connect the CN201 connector as the following.



2) STEPS

a. Rotate the SCREEN control on FBT (T444) gradually clockwise until the first horizontal line appears slightly on the screen.
b. Adjust the two CUT-OFF controls to obtain the slightly lighted horizontal line in the same levels of three colours (red, green and blue). The line looks like white if the CUT-OFF controls are adjusted properly.
c. Delete the connection of CN201.
d. Adjust the blue and green drive controls to obtain the proper white-balanced picture in high light areas.
e. Set the contrast control to the minmum position and turn the brightness control slightly counter clockwise to obtain a dark gray raster. Then check the white balance in low brightness. If the white balance is not enough, repeat the steps (a—e), for correct white balance.

14. CONVERGENCE ADJUSTMENT

Note: Before attempting any convergence adjustment, the receiver should be operated at least for fifeen minutes.

1) Centre Convergence Adjustment

a. Receive crosshatch pattern with a colour bar signal generator.
b. Adjust the BRIGHTNESS and CONTRAST Controls for a well defined pattern.
c. Adjust the two tabs of the 4-pole Magnets to change the angle beween them (See Fig.1) and superimpose the red and blue vertical lines in the centre area of the picture screen (See Fig.1)
d. Turn the both taps while at the same time keeping the angle constant and superimpose the red and blue horizontal lines at the centre of the screen (See Fig.2)
e. Adjust two tabs of 6-pole Magnets to superimpose red/blue line and green one. Adjusting the angle affects the horizontal lines.
f. Due to the interaction between these adjustments, steps c, d and e should be repeated until the satisfactory results are obtained.

2) Circumference Convergence Adjustment

a. Loosen the clmping screw of deflection yoke to allow the yoke to tilt.
b. Put a wedge as shown in Fig1 temporarly (Do not remove cover paper on adeshive part of the wedge).
c. Tilt the front of the deflection yoke up or down to obtain the better convergence in circumference (See Fig.3) Push the mounted wedge into the space between the picture tube and yoke to fix the yoke temporarily.
d. Put other wedge into the bottom space and remove the cover paper to stick.
e. Tilt the front of the yoke right or left to obtain the better convergence in circumference (See (See Fig.3)
f. Keep the yoke position and another wedge in either upper space. Remove the cover paper and stick the wedge on picture tube to fix the yoke.
g. Detach the temporarily mounted wedge and put it in another upper space. Stick it on this picture tube to fix the yoke.
h. After fxing three wedges, recheck overall convergence. Tighten the screw frimly to fix the yoke and check if the yoke is firm.
i. Stick 3 adhesive tabs on the wedges as shown in Fig.1.

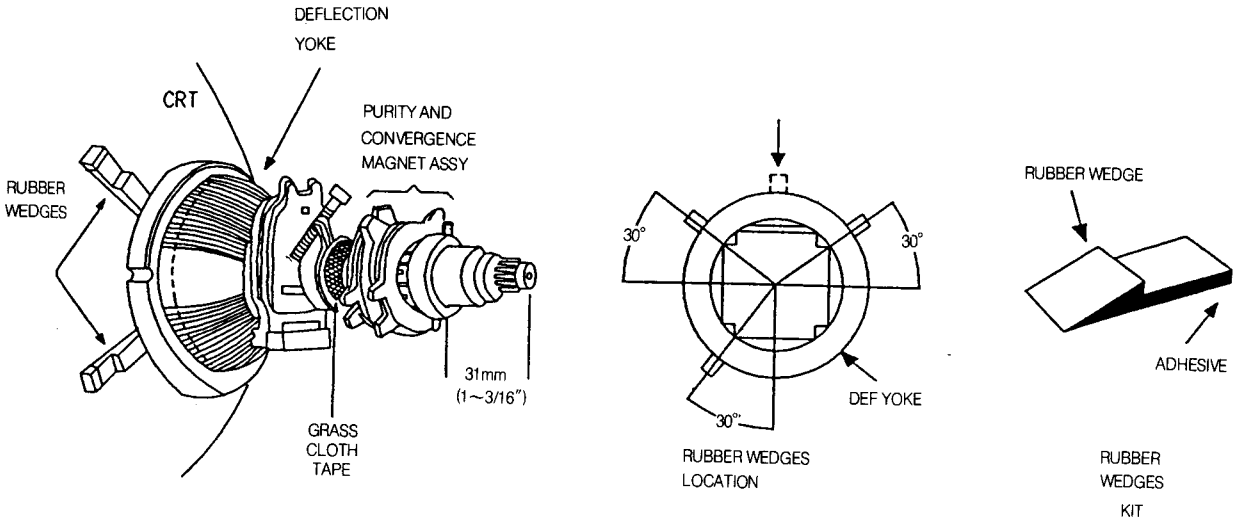


Figure 1. Tube Assembly

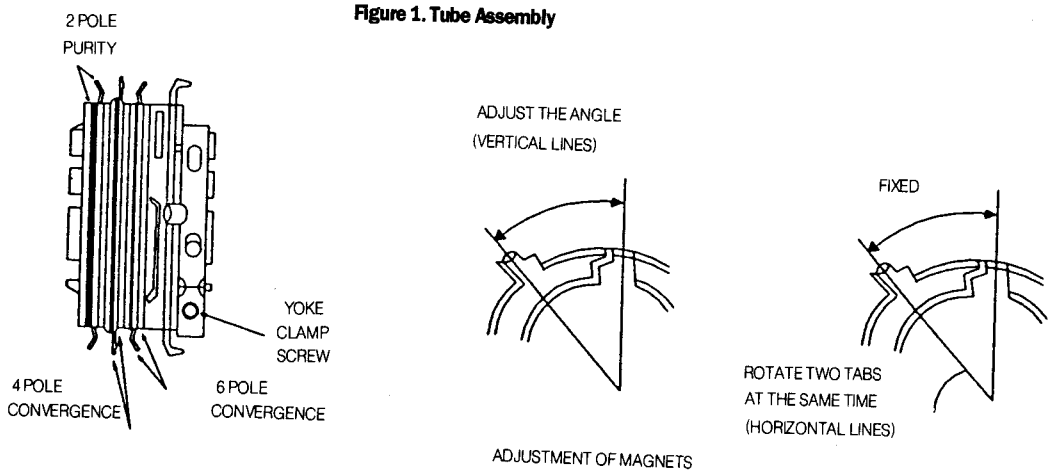
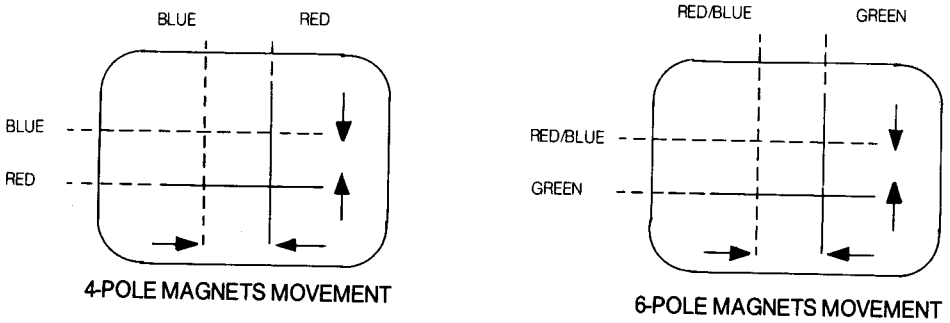


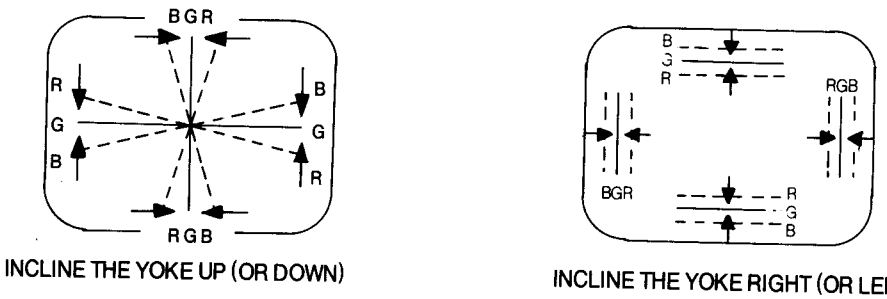
Figure 2 Purity and Convergence Magnets



4-POLE MAGNETS MOVEMENT

6-POLE MAGNETS MOVEMENT

Centre Convergence by Convergence Magnets



INCLINE THE YOKE UP (OR DOWN)

INCLINE THE YOKE RIGHT (OR LEFT)

Circumference Convergence by DEF. Yoke

Figure 3. Dot Movement Instructions

8. GENERAL ALIGNMENT INSTRUCTIONS

A. GENERAL

The alignment is an exacting procedure and should be undertaken only when necessary.
The test equipment specified or its equivalent is required to properly perform the alignment procedures which are outlined on the following pages.
The use of equipment which does not meet these requirements may result in the inability to align the receiver properly
It is essential that bias values as specified are maintained while the alignment to insure proper results.

B. EQUIPMENT TERMINATIONS

The alignment pads are designed for correct matching of the equipment to the circuits involved. The failure to the proper matching will result in representing the ture operation of the receiver.
The pads should be constructed as compactly as possible with all unshielded leads not being in excess of 2.5cm long.

C. SIGNAL

Since the large excessive of the sweep generator causes the overloading of receiver circuits, first, the output of the sweep generator set to zero and then gradually increase the output until a response is obtained.
Further increase changes in configuration, for example, flattening at the top or dropping below the base line at the botton, decrease the sweep output to restore the proper configuration.
The oscilloscope gain should be as high as possible to maintain a useable pattern with the peak-to-peak values specified, thus requiring a lower output from the sweep generator and less change of overload.
Insertion of makers from the marker generator should not cause the distortion of the response.

D. TEST EQUIPMENTS

1) PAL PATTERN GENERATOR (PM5518)
2) OSCILLOSCOPE
3) PROBE (which impedance is 75 ohm)
4) DIGITAL VOLTMETER

1. SECAM COLOUR ALIGNMENT

1) Preparation

a. Setting the trigger mode of the Oscilloscope to EXT. mode, hold the sync. using the induced horizontal voltage.
b. Set the time division of the scope to 20 μs/cm.
c. Set the Vert. Gain to 0.1V/cm.
d. Receive SECAM colour pattern.
e. The Colour, Brightness, and Contrast control to the maximum position.

2) Bell filter Alignmemt

a. Connect the probe (10:1) of the scope to ICS502 "4"pin.
b. Adjust TS01 so that each bar of (R-Y) and (B-Y) becomes even respectively (Fig. 1)

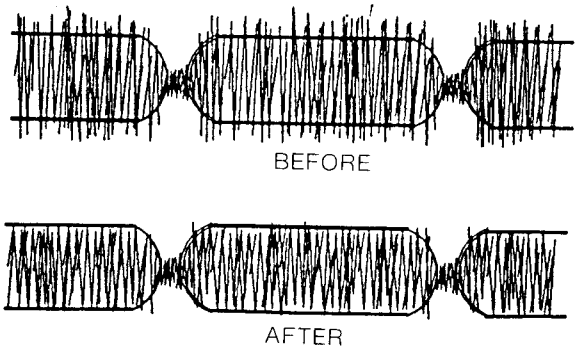


Figure 4

2. PAL COLOUR MATRIX ALIGNHENT

1) The Using Measurer

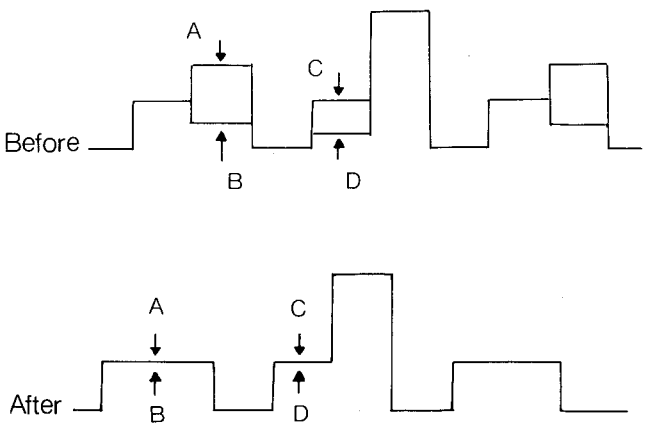
Oscilloscope (10:1 PROBE)

2) The Adjustment Preparation

a. Receive the PAL colour demodulator pattern.
b. Connect the oscilloscope to pin 16 of PWB Main Board IC501 (TDA3561A).
c. Set the Colour, Contrast Max, Bright to the proper brightness.

3) The Adjustment

a. By turning VR501, make A consistent with B.
b. By turning T501, make C consistent with D.



3. QUAD RATURE REFERENCE (DR/DB)

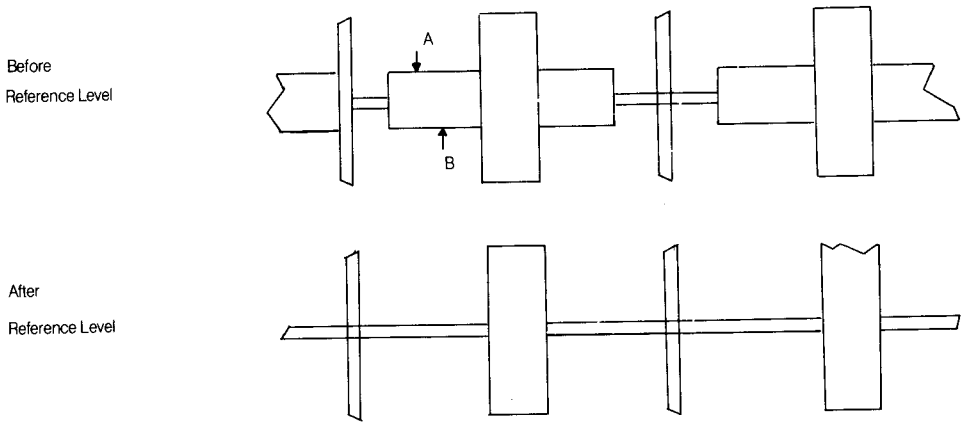
1) The Using Measurer
Oscilloscope (10 : 1 PROBE)

2) The Applicaion Preparation

a. Secam Philips Pattern receiving.
b. Connect the oscilloscope probe to pin 14 of the PWB Main Board ICS502 (TDA3590A).
c. brightness.
Set VRS01 to the center.

3) The Adjustment

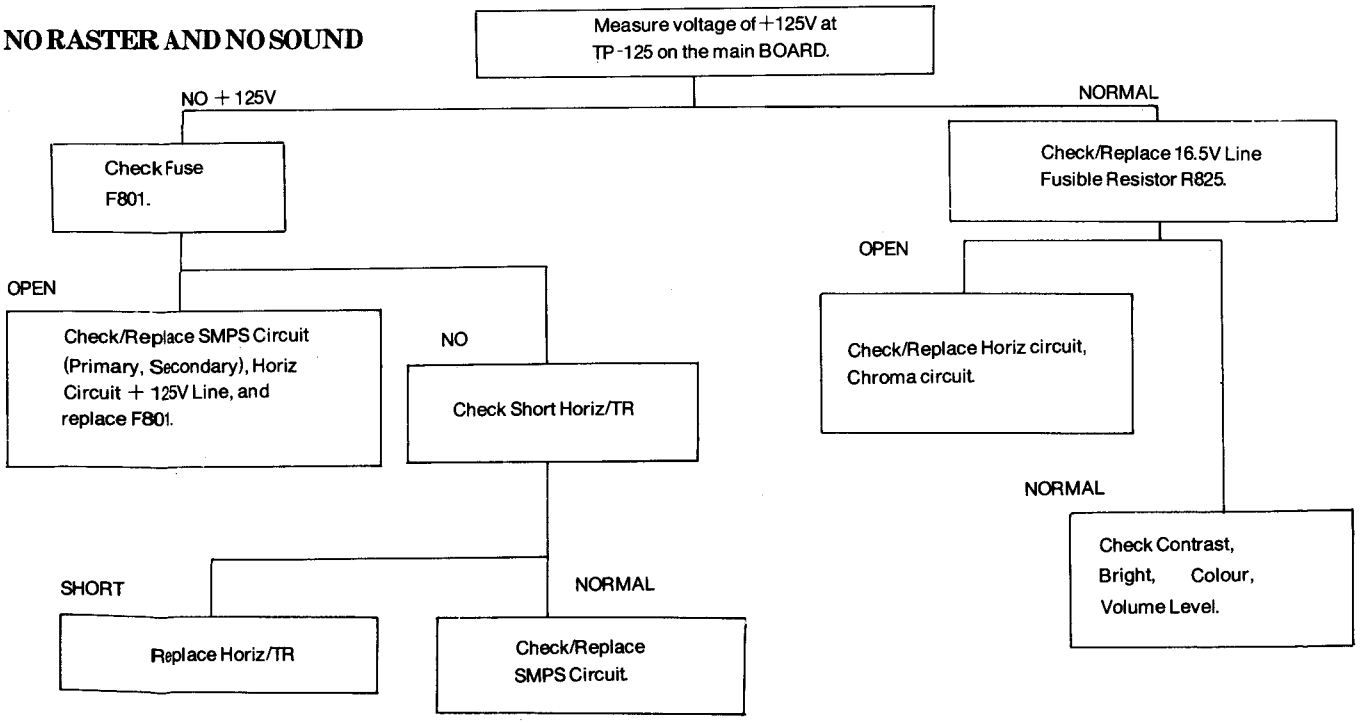
a. By adjusting TS02, make B-Y line consistent with REF LEVEL.
b. Move the oscilloscope probe to pin 13 of IC502.
c. By adjusting VR502 clockwise, make R-Y line consistent with REF LEVEL.



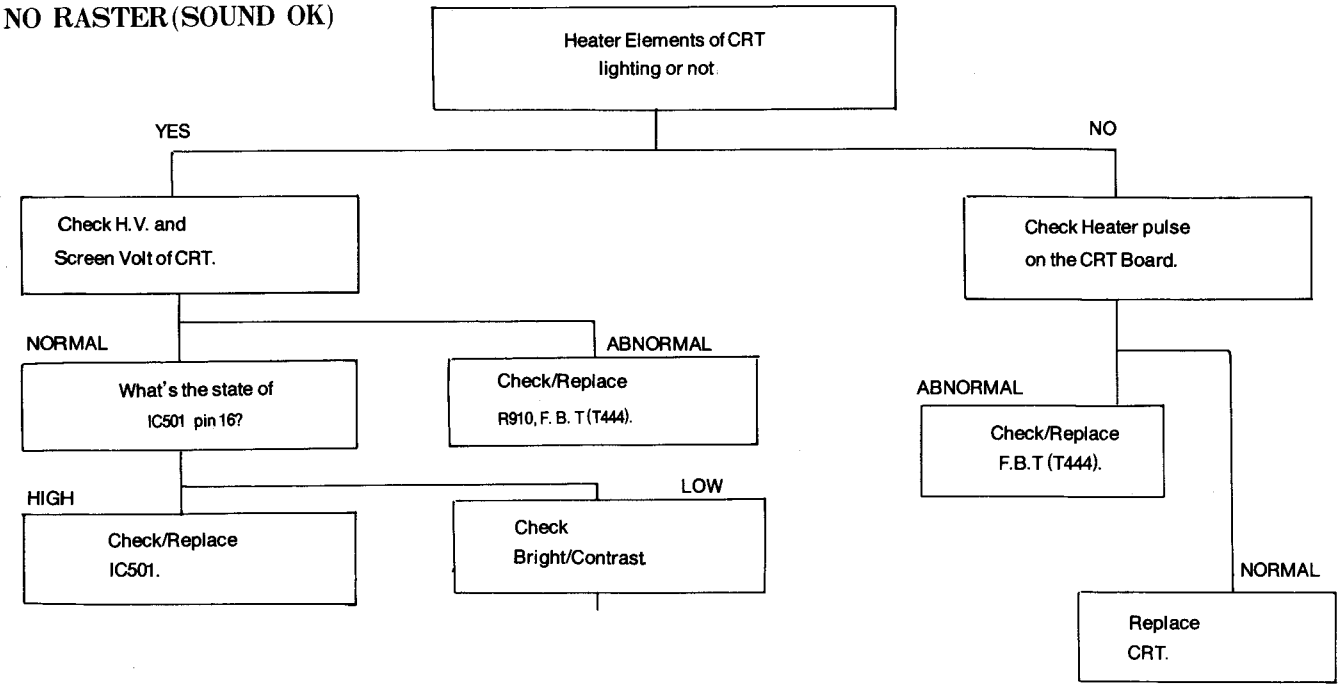
9. TROUBLE-SHOOTING CHARTS

The following charts are devoted to the trouble-shooting which, if followed cardfully, will assisy you in tracking down a fault to the correct stage.
In order to utilize charts (fault trees), first establish the complains, i.e-No Raster, No Sound.
Locate the chart applicable and then, progress through the various alternatives until a final block indicates the defective components or stages.

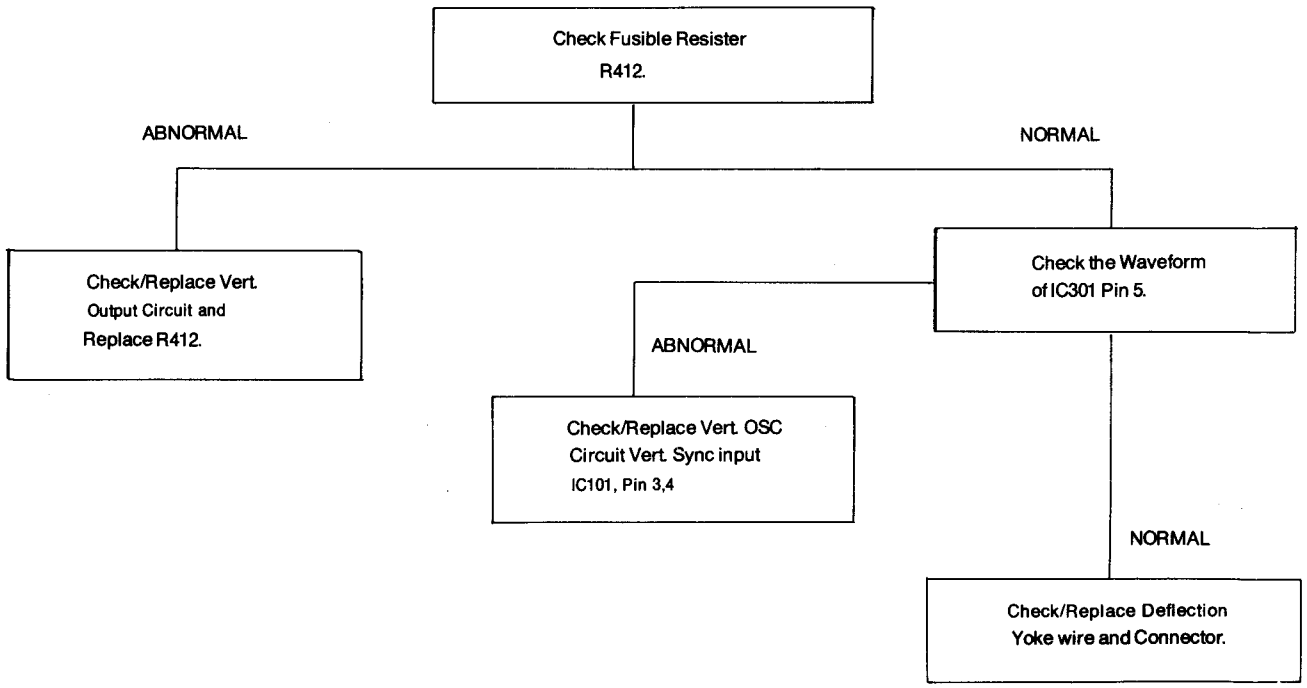
- NO RASTER AND NO SOUND



NO RASTER(SOUND OK)

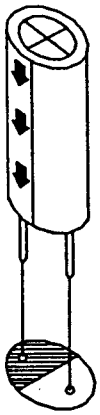


NO VERT. SCAN(ONE HORIZ. LINE RASTER)

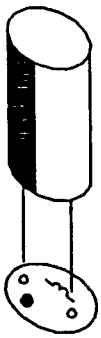


10. INSERTING FROM OF THE IMPORTANT PARTS.

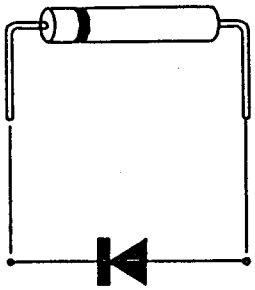
ELECTROL YTIC – CONDENSER



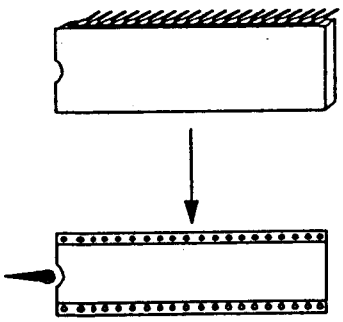
COIL – LINEARITY DIODE.



DIODE



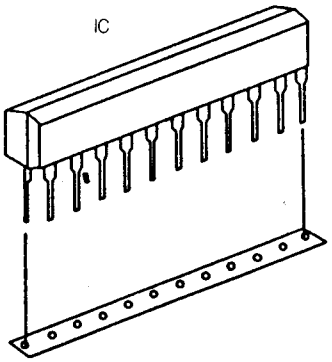
IC



TDA3651A
TDA3590A

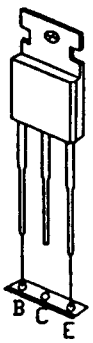
TDA8305

IC



TDA1013A/N4
TDA4601
KA2131

TRANSISTOR



KSL 8-Y

2SD1651D

2SC3552 – Y

TRANSISTOR

KSC2330 – 0
KSC2331 – Y
KSC815 – Y
KSA539 – Y

11. CHASSIS REPLACEMENT PARTS LIST

ABBREVIATIONS :

CC	C-CERAMIC	RC	R-COMPOSITION
CE	C-ELECTROLYTIC	RD	R-CARBON
CFS	C-M,POLYESTER	RF	R-FUSIBLE
CK	C-CERAMIC,HK	RM	R-METAL,FILM
CQ	C-POLYPROPYLENE,POLYESTE	RP	R-CEMENT WIRE
CS	C-TANTALIUM,SOLID	RS	R-METAL,OXIDE

NOTE : The items with "*" are usually out of stock since they are seldom required for the routine service. There may be some anticipated delay when you order these items.

S.N.A. = Service Not Available , L/C = Local Purchase

The components identified by mark '**' are critical for safety. Replace only with Supplier part number specified.

When indicating parts by location number, Please include the PWB names (PWB = Printed Writing Board)

Loc No	Supplier Parts No.	Specification	
	A S S Y - P W B M A I N		
	*3T30-01300-080	TVCR4500G/SGX	
PWB	33004-242-481	330X245X1.6T	(S.N.A)
	RESISTORS		
MR001	31018-377-122	RD 1/2T 1.2K-J	
MR002	31018-377-122	RD 1/2T 1.2K-J	
R121	31018-177-159	RD 1/8T 1.5-J	
R130	31018-177-104	RD 1/8T 100K-J	
R131	31018-177-681	RD 1/8T 680-J	
R132	31018-177-152	RD 1/8T 1.5K-J	
R133	31018-177-203	RD 1/8T 20K-J	
R134	31018-177-752	RD 1/8T 7.5K-J	
R135	31018-177-331	RD 1/8T 330-J	
R208	31018-177-222	RD 1/8T 2.2K-J	
R209	31048-175-102	RM 1/8T 1K-F	
R210	31018-376-124	RD 1/2T 120K-G	
R302	31048-175-474	RM 1/8T 470K-F	
R303	31018-177-332	RD 1/8T 3.3K-J	
R304	31018-377-681	RD 1/2T 680-J	
R305	31018-177-203	RD 1/8T 20K-J	
R306	31018-377-129	RD 1/2T 1.2-J	
R307	31018-177-333	RD 1/8T 33K-J	
R308	31018-177-183	RD 1/8T 18K-J	
R310	31018-177-153	RD 1/8T 15K-J	
R401	31018-177-104	RD 1/8T 100K-J	
R402	31048-176-303	RM 1/8T 30K-G	
R403	31018-177-182	RD 1/8T 1.8K-J	
R404	31018-177-824	RD 1/8T 820K-J	
R405	31018-177-272	RD 1/8T 2.7K-J	
R406	31018-177-220	RD 1/8T 22-J	
R407	31018-177-224	RD 1/8T 220K-J	
R408	31018-177-333	RD 1/8T 33K-J	
R409	31018-177-753	RD 1/8T 75K-J	
R410	31018-177-271	RD 1/8T 270-J	
R411	31018-377-680	RD 1/2T 68-J	
**R412	31059-002-010	RF 1/2P 1-J	
R414	31046-467-151	RS 1T 150-J (AUTO)	
R415	31046-467-102	RS 1T 1K-J (AUTO)	
R416	31018-177-683	RD 1/8T 68K-J	
R417	31018-177-563	RD 1/8T 56K-J	
R501	31018-177-512	RD 1/8T 5.1K-J	
R502	31018-177-152	RD 1/8T 1.5K-J	
R503	31018-177-102	RD 1/8T 1K-J	
R504	31018-177-302	RD 1/8T 3K-J	
R505	31018-177-471	RD 1/8T 470-J	
R506	31018-177-103	RD 1/8T 10K-J	
R507	31018-177-102	RD 1/8T 1K-J	
R509	31018-177-112	RD 1/8T 1.1K-J	
R513	31018-177-750	RD 1/8T 75-J	
R514	31018-177-750	RD 1/8T 75-J	
R515	31018-177-750	RD 1/8T 75-J	
R517	31018-177-111	RD 1/8T 110-J	
R518	31018-177-821	RD 1/8T 820-J	
R520	31018-177-124	RD 1/8T 120K-J	
R521	31018-177-561	RD 1/8T 560-J	
R522	31018-177-242	RD 1/8T 2.4K-J	
R523	31018-177-911	RD 1/8T 910-J	
R524	31018-177-511	RD 1/8T 510-J	
R550	31018-177-222	RD 1/8T 2.2K-J	
R551	31018-177-222	RD 1/8T 2.2K-J	
R552	31018-177-222	RD 1/8T 2.2K-J	
R614	31018-177-561	RD 1/8T 560-J	
R616	31018-177-681	RD 1/8T 680-J	
R617	31018-177-224	RD 1/8T 220K-J	
R618	31018-177-562	RD 1/8T 5.6K-J	
R619	31018-177-203	RD 1/8T 20K-J	
R620	31018-377-159	RD 1/2T 1.5R-J	
R621	31018-377-479	RD 1/2T 4.7-J	
**R801	31039-687-569	RW 7H 5.6-J	
R802	31049-317-104	RS 3P 2.7K-J	
R803	31046-567-154	RS 2T 150K-J(AUTO)	
R804	31018-177-221	RD 1/8T 220-J	
R805	31018-177-122	RD 1/8T 1.2K-J	
R806	31018-377-103	RD 1/2T 10K-J	

Loc No	Supplier Parts No.	Specification
R807	31018-177-113	RD 1/8T 11K-J
R808	31046-567-101	RS 2T 100-J(AUTO)
R809	31046-467-274	RS 1T 270K-J (AUTO)
R811	31018-177-103	RD 1/8T 10K-J
R812	31048-277-478	RM 1/4T 0.47-J
R813	31018-177-101	RD 1/8T 100-J
**R814	31039-586-390	RW 5J 39-J
R815	31028-328-475	RC 1/2P 4.7M-K
R821	31046-567-333	RS 2T 33K-J(AUTO)
R823	31046-567-330	RS 2T 33-J(AUTO)
R824	31046-567-101	RS 2T 100-J(AUTO)
**R825	31059-002-130	RF 1/2P 0.47-K
**R829	31059-002-130	RF 1/2P 0.47-K
R830	31018-177-202	RD 1/8T 2K-J
R831	31018-177-101	RD 1/8T 100-J
R832	31046-567-271	RS 2T 270-J(AUTO)
R833	31046-467-274	RS 1T 270K-J (AUTO)
**R834	31059-002-130	RF 1/2P 0.47-K
**R910	31059-004-010	RF 2P 0.47-K
RR10	31018-177-102	RD 1/8T 1K-J
RS01	31018-177-473	RD 1/8T 47K-J
RS02	31018-177-622	RD 1/8T 6.2K-J
RS03	31018-177-132	RD 1/8T 1.3K-J
RS04	31018-177-102	RD 1/8T 1K-J
RS05	31018-177-331	RD 1/8T 330-J
RS06	31018-177-221	RD 1/8T 220-J
RS07	31018-177-162	RD 1/8T 1.6K-J
RS08	31018-177-563	RD 1/8T 56K-J
RS09	31018-177-124	RD 1/8T 120K-J
RS11	31018-177-112	RD 1/8T 1.1K-J
RS12	31018-177-391	RD 1/8T 390-J
RS13	31018-177-911	RD 1/8T 910-J
RS14	31018-177-159	RD 1/8T 1.5-J
RS15	31018-177-202	RD 1/8T 2K-J
RS16	31018-177-122	RD 1/8T 1.2K-J
RS17	31018-177-202	RD 1/8T 2K-J
	VARIABLE-RESISTORS	
VR101	31249-128-004	EVN-DJA A03 B1K
VR201	31249-128-005	EVN-DJA A03 B5K
VR301	31249-128-004	EVN-DJA A03 B1K
VR303	31249-128-005	EVN-DJA A03 B5K
VR304	31249-128-003	EVN-DJA A03 B2K
VR401	31249-128-001	EVN-DJA A03 B10K
VR402	31249-128-008	EVN-DJA A03 B50K
VR501	31249-128-003	EVN-DJA A03 B2K
VR801	31249-128-005	EVN-DJA A03 B5K
VRS01	31249-128-004	EVN-DJA A03 B1K
	CAPACITORS	
C111	31607-402-230	CE04W TAPG 50V 3.3M
C113	31607-401-470	CE04W TAPG 16V 100M VENT
C130	31607-402-250	CE04W TAPG 50V 10M
C131	31607-402-220	CE04W TAPG 50V 2.2M
C132	31407-105-300	CC45(T) CH 50V 680-J
C207	31507-127-025	ECQ-V1H 334JZ3/2E 63V 0.3
C208	31407-105-700	CC45(T) CH 50V 151-J
C209	31507-127-025	ECQ-V1H 334JZ3/2E 63V 0.3
C301	31519-101-110	DSR 50V 0.22U-J
C302	31507-127-003	ECQ B1 H 332J F3
C303	31507-127-011	ECQ B1 H 683J F3
C304	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C305	31609-904-332	CE04W 25V 3300u
C306	31607-402-220	CE04W TAPG 50V 2.2M
C307	31607-402-290	CE04W TAPG 50V 100M-M(SG)
C308	31607-402-480	CE04W TAPG 50V 47-W(+20-0
C310	31507-127-022	ECQ B1 H 513J F3
C313	31507-127-023	ECQ B1 H 122J F3
C401	31519-101-100	DSR 50V 0.0027 U-J
C402	31607-402-240	CE04W TAPG 50V 4.7M
C403	31507-127-006	ECQ B1 H 103J F3
C404	31417-104-270	CK45 TAPG B 50V 681-K
C405	31507-127-000	ECQ B1 H 102J F3
C407	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C408	31507-127-001	ECQ B1 H 152J F3
C409	31507-127-006	ECQ B1 H 103J F3
C410	31417-344-222	CK45 TAPG F 50V 222-Z
**C411	31519-400-005	CFS 922M 1600V 0.0072-J
C414	31607-402-710	CE04W TAPG 35V 1000M-M
C416	31607-403-070	CE04W TAPG 100V 68M-M
C418	31607-403-450	CE04W TAPG 250V 1M
**C419	31509-335-190	CQ922M 200V 0.43M-J
C501	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C502	31607-401-510	CE04W TAPG 16V 1000U-M
C503	31417-104-400	CK45 TAPG B 50V 102-K
C504	31507-127-024	ECQ-V1H 224JZ3/2E 63V 0.2
C505	31507-127-008	ECQ B1 H 223J F3
C506	31407-105-660	CC45(T) CH 50V 101-J
C507	31407-105-660	CC45(T) CH 50V 101-J
C510	31607-402-220	CE04W TAPG 50V 2.2M
C511	31507-127-024	ECQ-V1H 224JZ3/2E 63V 0.2
C512	31607-402-220	CE04W TAPG 50V 2.2M
C513	31607-402-240	CE04W TAPG 50V 4.7M
C514	31507-127-025	ECQ-V1H 334JZ3/2E 63V 0.3
C515	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C516	31607-402-240	CE04W TAPG 50V 4.7M
C517	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C518	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C519	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C520	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C521	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C522	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C523	31607-402-210	CE04W TAPG 50V 1M
C524	31607-402-210	CE04W TAPG 50V 1M
C525	31607-402-550	CE04W 50V 6.8U-M
C526	31417-109-140	CK45 TAPG F 50V 103-Z
C612	31607-402-210	CE04W TAPG 50V 1M
C613	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
C614	31507-127-002	ECQ B1H 222J F3
C615	31507-127-016	ECQ B1 H 472J F3
C616	31607-402-070	CE04W TAPG 35V 22M
C617	31607-401-770	CE04W TAPG 25V 2200M-M(SG
C618	31507-127-006	ECQ B1 H 103J F3

Loc No	Supplier Parts No.	Specification
C620	31607-402-110	CE04W TAPG 35V 220M-M
C621	31507-127-002	ECQ B1H 222J F3
C623	31607-402-070	CE04W TAPG 35V 22M
**C800	31569-204-190	250V 0.47M/KNB 1530
**C801	31569-204-190	250V 0.47M/KNB 1530
**C802	31569-204-190	250V 0.47M/KNB 1530
**C803	31467-502-220	CK45P TAPG E250V 222-Z(1.
**C804	31467-502-220	CK45P TAPG E250V 222-Z(1.
**C805	31467-502-220	CK45P TAPG E250V 222-Z(1.
**C806	31467-502-220	CK45P TAPG E250V 222-Z(1.
**C807	31606-403-780	CE04W 400V 100M-M(LIG)R
C808	31607-401-470	CE04W TAPG 16V 100M VENT
C809	31407-106-760	CC45(T) RH 50V 151-J
C810	31509-332-000	CQ922M 100V 0.0082-J
C811	31607-402-250	CE04W TAPG 50V 10M
C812	31507-127-004	ECQ B1 H 562J F3
C813	31607-401-470	CE04W TAPG 16V 100M VENT
**C814	31509-391-090	CQ922M 1600V 0.0022-J
**C816	31417-901-660	CK45(T) B1KV 222-K
C817	31607-401-680	CE04W TAPG 25V 100U
**C818	31469-504-060	ECK-DNS472MEX/E400V 472(T
**C823	31417-767-331	CK45(T) B2KV 331-K
C824	31609-403-140	CE04W 160V 220U-M
C825	31607-401-720	CE04W TAPG 25V 1000M-M
**C827	31417-767-331	CK45(T) B2KV 331-K
C828	31607-401-770	CE04W TAPG 25V 2200M-M(SG
C829	31607-401-510	CE04W TAPG 16V 1000U-M
**C833	31417-767-331	CK45(T) B2KV 331-K
C834	31607-402-110	CE04W TAPG 35V 220M-M
CS01	31607-402-210	CE04W TAPG 50V 1M
CS02	31407-047-220	CC45(T) RH 50V 220-J
CS03	31407-106-630	CC45(T) RH 50V 470-K
CS04	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
CS05	31407-047-220	CC45(T) RH 50V 220-J
CS06	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
CS07	31607-402-220	CE04W TAPG 50V 2.2M
CS08	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
CS09	31407-106-260	CC45(T) RH 50V 101-J
CS10	31407-047-271	CC45(T) RH 50V 271-J
CS11	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
CS12	31407-047-221	CC45(T) RH 50V 221-J
CS13	31407-047-221	CC45(T) RH 50V 221-J
CS14	31507-127-012	EVQB1 H 104J-F3/2E 63V 10
CS15	31607-401-470	CE04W TAPG 16V 100M VENT
CS16	31607-402-210	CE04W TAPG 50V 1M
CS17	31407-101-240	CC45(T) SL 50V 330-J
CS18	31407-106-230	CC45(T) RH 50V 300-J
CS19	31417-104-250	CK45 TAPG B 50V 471-K
CS20	31507-127-024	ECQ-V1H 224JZ3/2E 63V 0.2
CS21	31507-127-024	ECQ-V1H 224JZ3/2E 63V 0.2
CS22	31407-047-221	CC45(T) RH 50V 221-J
CS23	31407-048-820	CC45(T) RH 50V 820-K
CS24	31409-105-180	CC45 CH 50V 220-J
CV01	31829-105-610	TZ03P 450E
		I.C

Loc No	Supplier Parts No.	Specification
IC101	32119-102-250	TDA8305
IC501	32119-103-360	TDA3561A/N8
IC502	32119-501-080	TDA3590A/N3
		TRANSISTORS
Q110	32137-401-530	KSA 539-Y(TAPG)
Q111	32137-401-530	KSA 539-Y(TAPG)
Q401	32137-301-560	KSC 2331-Y(TAPG)
**Q802	32149-401-270	KSD 288-Y (AUTO)
**Q803	32137-301-560	KSC 2331-Y(TAPG)
QS01	32137-301-720	KSC 815-Y(TAPG)
		DIODE
D100	32167-406-480	1N4148 TAPG
D101	32167-406-480	1N4148 TAPG
D201	32167-201-070	1N4003 TAPG
D302	32167-201-170	TVR10G(TAPG)
D401	32167-201-160	TVR06G(TAPG)
D402	32167-201-160	TVR06G(TAPG)
D404	32167-201-070	1N4003 TAPG
**D405	32169-301-610	RG2
D503	32167-406-480	1N4148 TAPG
D506	32167-406-480	1N4148 TAPG
D507	32167-406-480	1N4148 TAPG
D508	32167-406-480	1N4148 TAPG
D801	32167-201-180	M100J(TAPG)
D802	32167-201-180	M100J(TAPG)
D803	32167-201-180	M100J(TAPG)
D804	32167-201-180	M100J(TAPG)
D805	32167-208-550	ERC24-06
D806	32167-208-550	ERC24-06
D807	32167-406-480	1N4148 TAPG
D808	32167-208-550	ERC24-06
D809	32167-208-550	ERC24-06
D821	32167-208-550	ERC24-06
D822	32167-208-550	ERC24-06
D823	32167-208-550	ERC24-06
DS01	32167-101-130	1K34A (TAPG)
DS02	32167-406-480	1N4148 TAPG
DZ807	32167-408-080	EQA02-06D/MTZ6.2B(TAPG)
		THERMISTOR
**P802	32189-102-030	P2462-J29/J29-P190-A20
		POSISTOR
**P801	32189-609-330	PTH451C202BG360N270
		COILS
D-COIL	32479-029-200	22RT 120L 1360
DL501	32469-104-060	ADL-CS344E
L401	32449-412-310	110UH-300UH
L403	32429-805-980	6800UH-K
L404	32449-705-020	DS48-157UH
L501	32427-803-410	8.2UH-M
L502	32427-803-410	8.2UH-M
L503	32427-822-010	15UH-J TAPG

Loc No	Supplier Parts No.	Specification
L504	32427-803-410	8.2UH-M
L601	32427-805-852	AL03 101-K
**L800	32426-633-090	39MHX2(U)R
**L801	32426-633-090	39MHX2(U)R
L802	32429-226-080	1UH-K
L803	32429-226-160	4.7UH-K
LS01	32427-803-410	8.2UH-M
LS02	32427-822-010	15UH-J TAPG
		DELAY-LINE
X201	32469-200-000	CDL471P
X202	32469-107-050	DL4701F(1150R)
		TRANS
**L824	32499-005-010	16UH,K-16(MAT-FBT)
**L902	32499-004-010	25MH (K-16)
**T401	32849-070-002	7.3MH/105UH
T501	32709-024-260	4MHZ
**T801	32899-002-405	P:160-260 S:125/18/12V
TS01	32709-024-290	4.286MHZ(7CAN)
TS02	32709-024-300	4.33 MHZ(7CAN)
		TRANS-FLYBACK
**T444	32859-200-000	FCM-20A015
		MISCEALLEOUS
CN100	33347-108-310	67094-003(AUTO)
CN201	33347-108-180	67094-005 (AUTO)
CN601	33347-108-310	67094-003(AUTO)
CN901	33347-108-180	67094-005 (AUTO)
CN902	33347-108-310	67094-003(AUTO)
CN903	33347-108-180	67094-005 (AUTO)
CN904	33344-112-680	5267-08
F/CLIP	33167-001-001	PFC 5000-0202
SHILED	34542-105-010	SPTE T0.25 P58M,MAIN
		CORE-FERRITE,BEAD
L804	34047-019-060	3.5X6X1.0
L805	34047-019-060	3.5X6X1.0
		CRYSTAL
X501	34537-001-020	8.867238MHZ(TAPG)
		FUSE
FUSE	34709-084-730	FST 250V 3.15A 20MM SEMKO
		ASSY-H/SINK VERT(SOUND)
	*3H82-00070-000	35684-116-210,TDA1013A
**IC601	32119-201-070	TDA1013A/N4
H/SINK	35684-116-210	SPC-1 T1.0 FT2 (S.N.A)
SCREW	37158-230-061	2S-3X6 FE FZY (S.N.A)
		ASSY-H/SINK VERT(POWER)

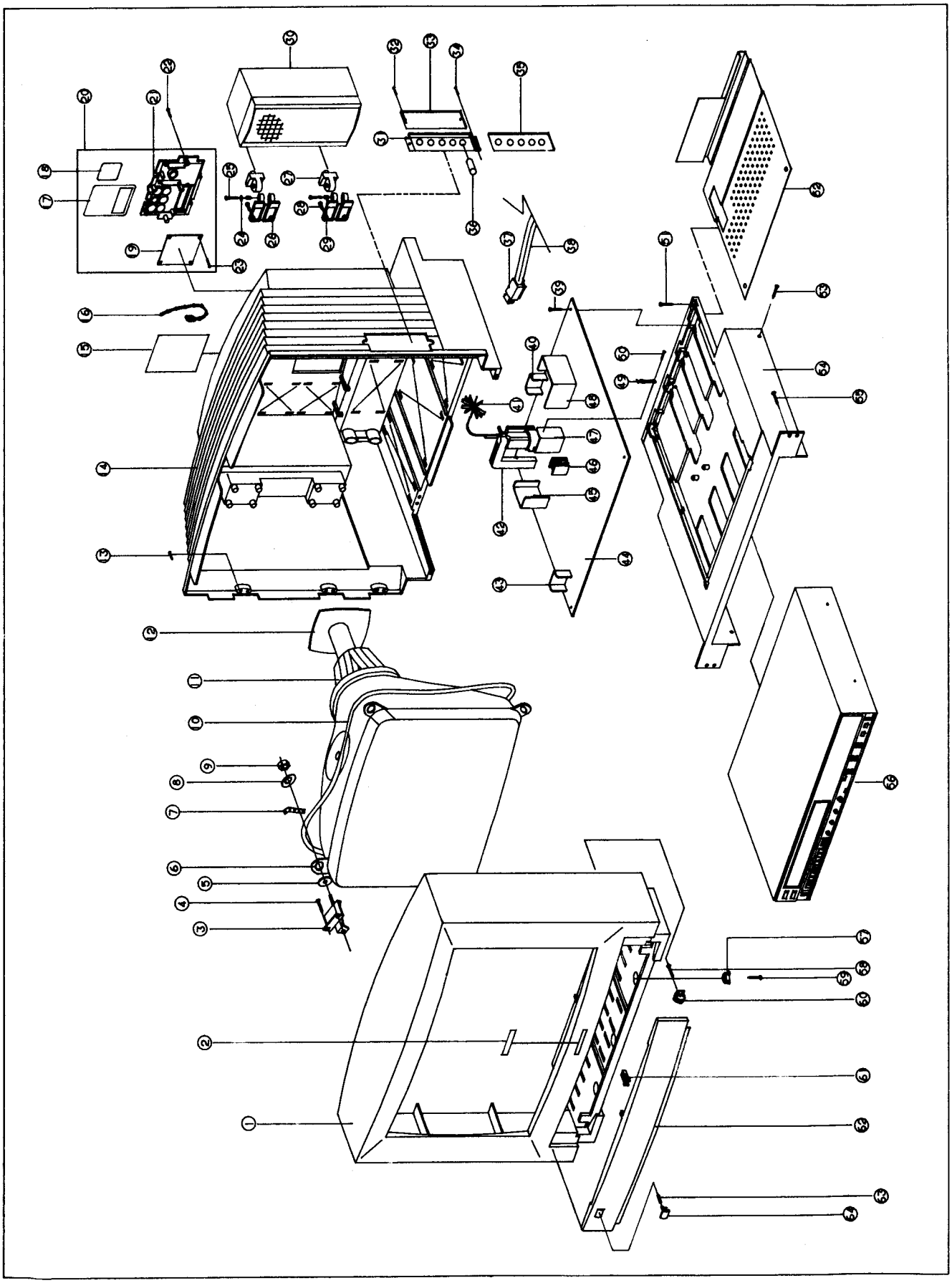
Loc No	Supplier Parts No.	Specification
	*3H82-00080-000	35684-113-710,TDA4601
**IC801	32119-401-010	TDA4601
H/SINK	35684-113-710	CUSI 1/2H T0.5 (S.N.A)
SCREW	37048-130-061	+M3X6 FE FZY (S.N.A)
NUT	37208-113-001	1-M3 FE FZY (S.N.A)
		ASSY-H/SINK VERT(HORI)
	*3H82-00170-001	20
**Q401	32159-210-003	2SD1651YD
H/SINK	35684-118-110	SPC-1 T1.0 FT2 (S.N.A)
SCREW	37158-230-101	2S-3X10 FE FZY (S.N.A)
WASHER	37334-105-910	SPC-1 T1.0 FZY-1 (S.N.A)
		ASSY-H/SINK VERT
	*3H82-00260-000	35684-119-010,KA2131
**IC301	32119-102-300	KA 2131
H/SINK	35684-119-010	SPC-1 T1.0 FT2 (S.N.A)
HOLDER	36604-134-510	NYLON 66 VO NTR (S.N.A)
SCREW	37148-530-081	2S-3X8 FE FZY (S.N.A)
SCREW	37158-230-061	2S-3X6 FE FZY (S.N.A)
		ASSY-H/SINK POWER
	*3H83-00190-001	32149-301-010,2SC3552
**Q801	32149-301-010	2SC3552/WITH,ACC
H/SINK	35684-118-910	A1050S-H14 T2.0 (S.N.A)
SCREW	37158-230-101	2S-3X10 FE FZY (S.N.A)
		ASSY-H/SINK TR
	*3H84-00020-000	35684-118-330,MC7812C
**IC150	32119-901-110	MC7812C (AUTO)
H/SINK	35684-118-330	A6063 EXTR BLK (S.N.A)
SCREW	37158-230-061	2S-3X6 FE FZY (S.N.A)
		A S S Y - T R A N S M I T T E R
	*3F14-00027-040	TM27,RM204,42,BLK,NO,ERG
PWB	33004-540-091	58X153X1.2T (S.N.A)
BATT-1	36674-143-110	SWPA N:2B CU3(-) 0.06
BATT-2	36674-143-210	SWPA N:2B CU3(+) 0.06
BATT-3	36674-143-310	SUS304 0.06(COM)
CASE-B	36031-115-110	ABS HB BLK
CASE-T	36031-115-010	ABS HB BLK
CT01	31607-401-460	CE04W TAPG 16V 47M
CT02	31417-109-140	CK45 TAPG F 50V 103-Z
CT03	31417-104-050	CK45 TAPG B 50V 101-K
CT04	31417-104-050	CK45 TAPG B 50V 101-K
DOOR	37643-160-610	ABS HB BLK
DT01	32167-406-480	1N4148 TAPG
DT02	32167-406-480	1N4148 TAPG
DT03	32167-406-480	1N4148 TAPG
DT04	32167-406-480	1N4148 TAPG
DT05	32167-406-480	1N4148 TAPG
DT06	32167-406-480	1N4148 TAPG
DT08	32167-406-480	1N4148 TAPG

Loc No	Supplier Parts No.	Specification
DT09	32167-406-480	1N4148 TAPG
ICT01	32109-101-490	M50560-155P
LT01	32309-101-100	CL-2/SSIR-5C
PE-BAG	38653-108-081	LDPE T0.08 250X90
PVC	37802-129-040	TM27,43KEY,TVCR4500P,W/O,
QT01	32137-301-720	KSC 815-Y(TAPG)
RT01	31018-177-109	RD 1/8T 1-J
RUBBER	33142-112-030	TM-27,43KEY TVCR4500P,NO
WINDOW	37653-124-010	ACRYL(DARK VIOLET)
XT01	34539-050-010	CSB455EBL/KBR455BKTLR
		A S S Y - A C C E S S O R Y
CARD	38124-121-320	ART PAPER 100,QUELLE
CARD-W	38124-121-790	ART PAPER 120(FTZ)
I/B	38134-395-610	WHT PAPER 120(S) TVCR4500
		A S S Y - P W B C R T
	*3C32-50037-000	21
PWB	33004-212-601	80X70X1.6T P58M (S.N.A)
BAND-T	36635-001-810	NYRON 6.6 DONG-A DATL-250
C901	31417-104-560	CK45 TAPG B 50V 561-K
C902	31417-104-250	CK45 TAPG B 50V 471-K
C903	31417-104-560	CK45 TAPG B 50V 561-K
C904	31607-401-470	CE04W TAPG 16V 100M VENT
C905	31417-767-102	CK45(T) B2KV 102-K
L901	32429-039-090	170UH-K
LEAD	33058-004-016	S3XS3/F/400
LEAD	33058-009-176	S5XS5/F/400/3
Q901	32149-301-190	2SC2068
Q902	32149-301-190	2SC2068
Q903	32149-301-190	2SC2068
R901	31018-177-101	RD 1/8T 100-J
R902	31018-177-101	RD 1/8T 100-J
R903	31018-177-101	RD 1/8T 100-J
R904	31049-316-270	RS 2N 27K-J
R905	31049-316-270	RS 2N 27K-J
R906	31049-316-270	RS 2N 27K-J
R907	31028-328-472	RC 1/2T 4.7K-K
R908	31028-328-472	RC 1/2T 4.7K-K
R909	31028-328-472	RC 1/2T 4.7K-K
R913	31018-177-431	RD 1/8T 430-J
R914	31018-177-431	RD 1/8T 430-J
R915	31018-177-431	RD 1/8T 430-J
R916	31018-177-151	RD 1/8T 150-J
R920	31049-103-333	RS 2P 33K-J
R921	31049-103-333	RS 2P 33K-J
R922	31049-103-333	RS 2P 33K-J
V999A	33359-063-620	HF-29.1A
VR901	31249-128-005	EVN-DJA A03 B5K
VR902	31249-128-005	EVN-DJA A03 B5K
VR903	31249-128-005	EVN-DJA A03 B5K
VR904	31249-128-006	EVN-DJA A03 B200
VR905	31249-128-006	EVN-DJA A03 B200
		A S S Y - P W B S O U N D B O A R D

Loc No	Supplier Parts No.	Specification
	*3C60-07138-010	TVCR4500G
PWB	33004-212-641	97X73X1.6 MVR (S.N.A)
AC01	31419-109-100	CK45 F 50V 102-Z
AC02	31419-109-100	CK45 F 50V 102-Z
AL01	32429-039-210	R6H 6X10 H0.8
BOARD	33302-106-110	HIPS V0 BLK
CN601	33055-216-213	S3/2405/500
JCK01	33304-114-310	PUSH-4P
PTS+TB	37148-530-121	2S-3X12 FE FZY
PVC	37804-112-210	PVC-SHEET T0.3 BLK
PVC	37803-117-860	PVC-SHEET V0 T0.3 BLK
TBA+TS	37148-530-101	2S-3X10 FE FZY
		A S S Y - P W B C O N T R O L
	*3C64-01100-010	TVCR4500G,CP2,CONTROL
PWB	33004-242-491	130X50X1.6T TVC (S.N.A)
BAND-T	36634-111-110	NYLON66 V2 NTR 100MM
CA+PCB	37148-530-101	2S-3X10 FE FZY
CASE-VR	36033-104-110	HIPS V0 BLK TVCR4500
CNP801	33059-103-142	P2/D1W/500
H/CORD	36603-111-310	P.P V0 BLK (NEW)
MASTER	37624-168-910	ABS HB BLK
PVC	38093-108-020	PVC-SHEET T0.3 P58M,SYM M
PWR-CO	33053-816-701	KJP-140/LTCE-2F/8FT(300UH
RC01	31018-177-333	RD 1/8T 33K-J
RC02	31018-177-102	RD 1/8T 1K-J
RC03	31018-177-473	RD 1/8T 47K-J
RC04	31018-177-153	RD 1/8T 15K-J
RC05	31018-177-822	RD 1/8T 8.2K-J
RC06	31018-177-203	RD 1/8T 20K-J
RC07	31018-177-822	RD 1/8T 8.2K-J
RC08	31018-177-822	RD 1/8T 8.2K-J
RC09	31018-177-303	RD 1/8T 30K-J
S801	33529-402-004	ESB-90217S
SCREW	37048-130-061	+M3X6 FE FZY
VRC01	31202-116-055	V0 12L PV 20U-B10KR (C.C)
VRC02	31202-116-053	V012L-PV 20U B10KR
VRC03	31202-116-055	V0 12L PV 20U-B10KR (C.C)
		A S S Y - S U R R , S P K
	*3H93-10006-020	HIPS V0 BLK 066 3W82
		A S S Y - C R T
**V888	32019-255-108	54HGB99X-ITC
		A S S Y - V C R
	*3V00-00001-210	TVCR4500G/SGX

MEMO

12. EXPLODED-VIEW



TVCR4500G/SGX

The items with "*" are usually out of stock since they are seldom required for the routine service. There may be some anticipated delay when you order these items.

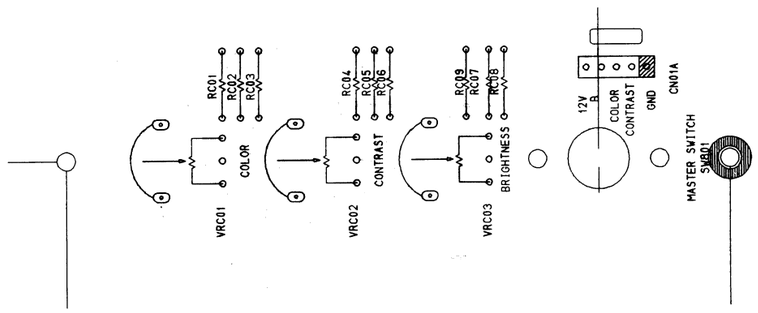
*** S.N.A = SERVICE NOT AVAILABLE.***

NO	CODE NO	DESCRIPTION	SPECIFICATION	Q'TY
1	*3G90-M4500-020	ASSY-CABINET,FRONT	TVCR4500P	1
	36001-154-010	CABINET-FRONT	HIPS HB BLK #066	1
2	38024-176-120	BADGE-BRAND	AL-FOGING SAMSUNG	1
3	36614-212-730	BRKT-CRT	SBHG-1 100 EGI T1.6	4
4	37148-540-152	SCREW-TAP,RH	2S-4X15 FE FZW	12
5	37333-101-110	WASHER-GUM,CRT	NATURAL RUBBER BLK	4
6	32019-255-108	CRT-COLOR	54HGB99X-ITC	1
7	36634-111-710	CLAMPER-WIRE	PVC BLK 105MM	2
8	37334-105-530	WASHER-SPRING	SBHG-1 100 T1.6	4
9	37208-115-001	NUT-HEX	1-M5 FE FZY	4
10	32479-029-000	COIL-DEGAUSSING	22RT 120L 1360	1
11		DEFL-YOKE	I T C	
12	*3C32-50037-000	ASSY-PWB,CRT	P58M,21",2R,F.S,T	1
	33004-212-601	PWB-CRT <S.N.A>	P58M(UNITS PART)	1
13	37148-540-153	SCREW-TAP,RH	2S-4X15 FE FZW	10
14	36000-155-020	CABINET-BACK	HIPS V0 BLK	1
15	38114-702-910	LABEL-RATING	TETRONE PAPER 90(S)	1
16	36633-101-610	CLAMPER-CORD	P.E BLK	1
17	37803-117-860	PVC-TERMINAL	PVC-SHEET T0.3	1
18	37804-112-210	PVC-TERMINAL,A	PVC-SHEET T0.3	1
19	33004-212-641	PWB-TER,SND <S.N.A>	MVR4500X	1
20	*3C60-07138-000	ASSY-SOUND,TER	TVCR4500P	1
21	33302-106-110	TERMINAL-BOARD,ANT	HIPS V0 BLK	1
22	37148-540-153	SCREW-TAP,RH	2S-4X15 FE FZB	3
23	37148-530-121	SCREW-TAP,RH	2S-3X12 FE FZY	6
24	37304-104-310	WASHER-PLATE	SPC-1 T0.5	4
25	37158-130-303	SCREW-TAP,BH	1-3X30 FE FZB	4
26	36603-121-810	HOLDER-SPEAKER,A	V0 BLK	4
27	36603-121-910	HOLDER-SPEAKER,B	V0 BLK	4
28	37148-530-163	SCREW-TAP,RH	2S-3X16 FE FZB	8
29	36674-146-610	SPRING-COIL	HSWR T01.0	4
30	*3H93-10006-020	ASSY-SURR,SPEAKER	MVR4500P	2
31	36033-104-110	CASE-VR	HIPS V0 MVR4500P	1
32	37148-530-101	SCREW-TAP,RH	2S-3X10 FE FZY	2
33	*3C64-01100-010	ASSY-PWB,CONTROL	TVCR4500P CP2	1
	33004-242-291	PWB-CONTROL <S.N.A>	MVR4500P(UNITS PART)	1

NO	CODE NO	DESCRIPTION	SPECIFICATION	Q'TY
34	37118-530-103	SCREW-TAP,RH	2S-3X10 FE FZB	2
35	38093-108-020	PVC-CONTROL	PVC-SHEET T0.3	1
36	37624-168-910	KNOB-POWER	ABS HB BLK	1
37	36603-111-310	HOLDER-CORD	P.P V0 BLK	1
38	33053-816-701	POWER-CORD,AC	KJP-140	1
39	37154-101-210	SCREW-WASHER,SPEC	2S-3X10 FE FZY	6
40	*3H82-00080-000	ASSY-H/S,VERT(POWER)	TDA4601	1
41	36633-101-310	CLAMPER-WIRE,FBT	ABS V0 NTR	1
42	32859-200-000	TRANS-FLYBACK	FCM-20A015	1
43	*3H82-00070-000	ASSY-H/S,VERT(SOUND)	TDA1013A	1
44	*3T30-01300-080	ASSY-chassis	TVCR4500P	1
	33004-242-481	PWB-MAIN <S.N.A>	P58M	1
45	*3H82-00170-001	ASSY-H/S,VERT(HORI)	2SD1651	1
46	*3H84-00020-000	ASSY-H/S,TR	MC7812C	1
47	*3H82-00260-000	ASSY-H/S,VERT	KA2131	1
48	*3H83-00190-001	ASSY-H/S,POWER	2SC3552	1
49	36604-134-510	HOLDER-WIRE	NYLON 66 V0 NTR	1
50	37148-530-081	SCREW-TAP,RH	2S-3X8 FE FZY	1
51	37154-101-210	SCREW-WASHER,SPEC	2S-3X10 FE FZY	4
52	34542-105-010	SHIELD-CASE,A	SPTE T0.25 P58M	1
53	37148-540-153	SCREW-TAP,RH	2S-4X15 FE FZY	2
54	36601-237-110	HOLDER-CHASSIS	ABS V0 NTR	1
55	37128-540-201	SCREW-TAP,TH	2S-4X20 FE FZY	2
56	*3V00-00001-210	ASSY-VCR(X1)	MVR4500P	1
57	36604-138-510	HOLDER-VCR	ABS HB BLK	2
58	37148-530-121	SCREW-TAP,RH	2S-3X12 FE FZY	1
59	37128-540-151	SCREW-TAP,RH	2S-4X15 FZY	2
60	35208-100-030	DAMPER-DOOR	DAMPER GEAR	1
61	36698-100-110	CATCH-PUSH,DOOR	KIFUCO LA701	1
62	37642-136-630	DOOR-CONTROL	PC TVCR4500P	1
63	36674-137-820	SPRING-KNOB,POWER	SUS 304 0 0.6	1
64	37623-153-410	KNOB-POWER	ABS HB BLK #066	1

MEMO

PWB-CONTROL

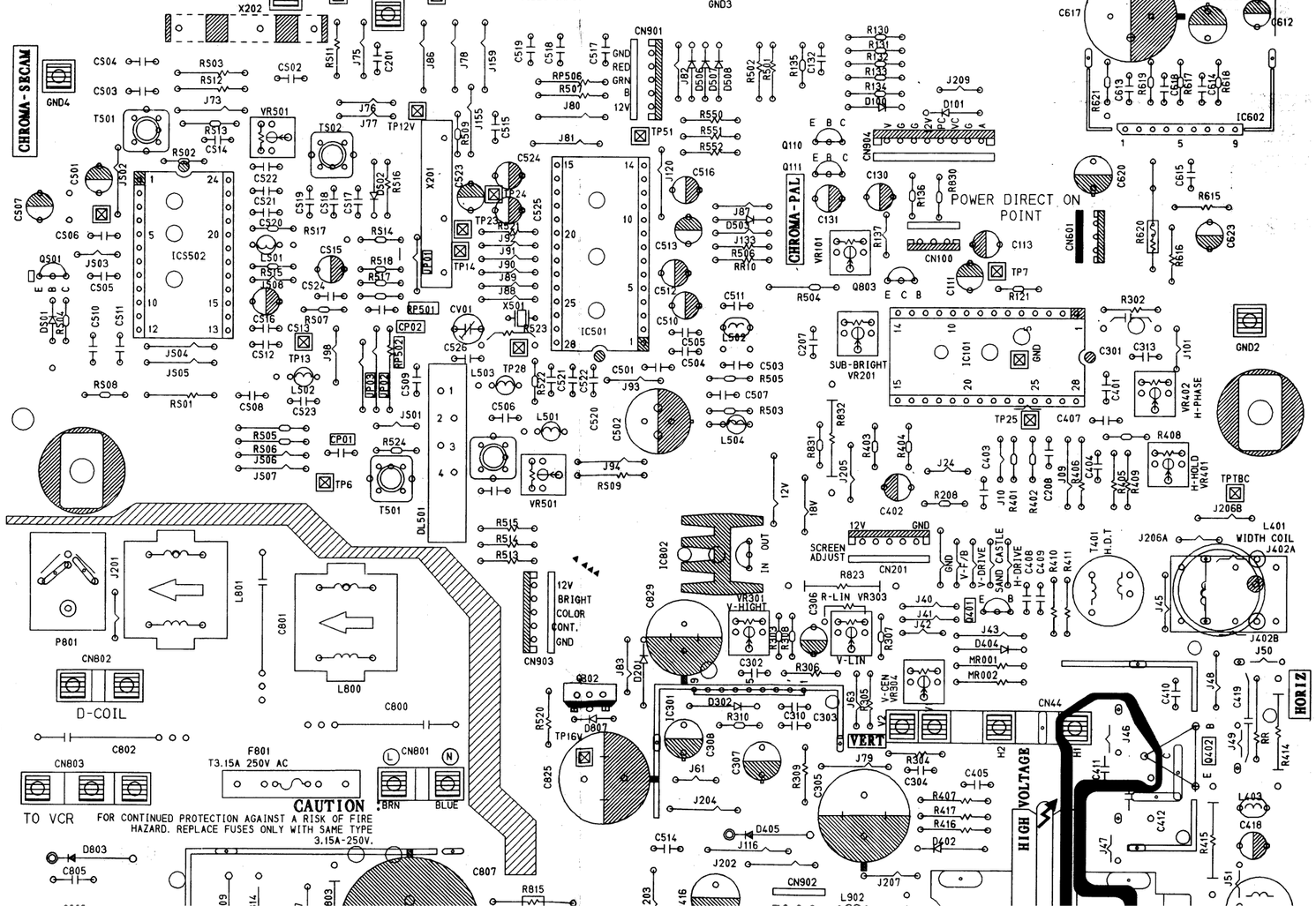


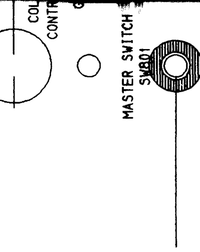
PWB-MAIN

PWB-SOUND, TERMINAL

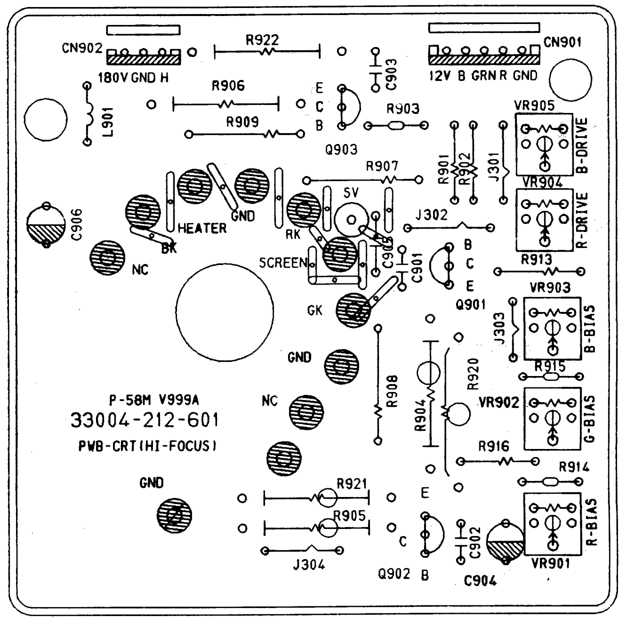
PWB-CRT

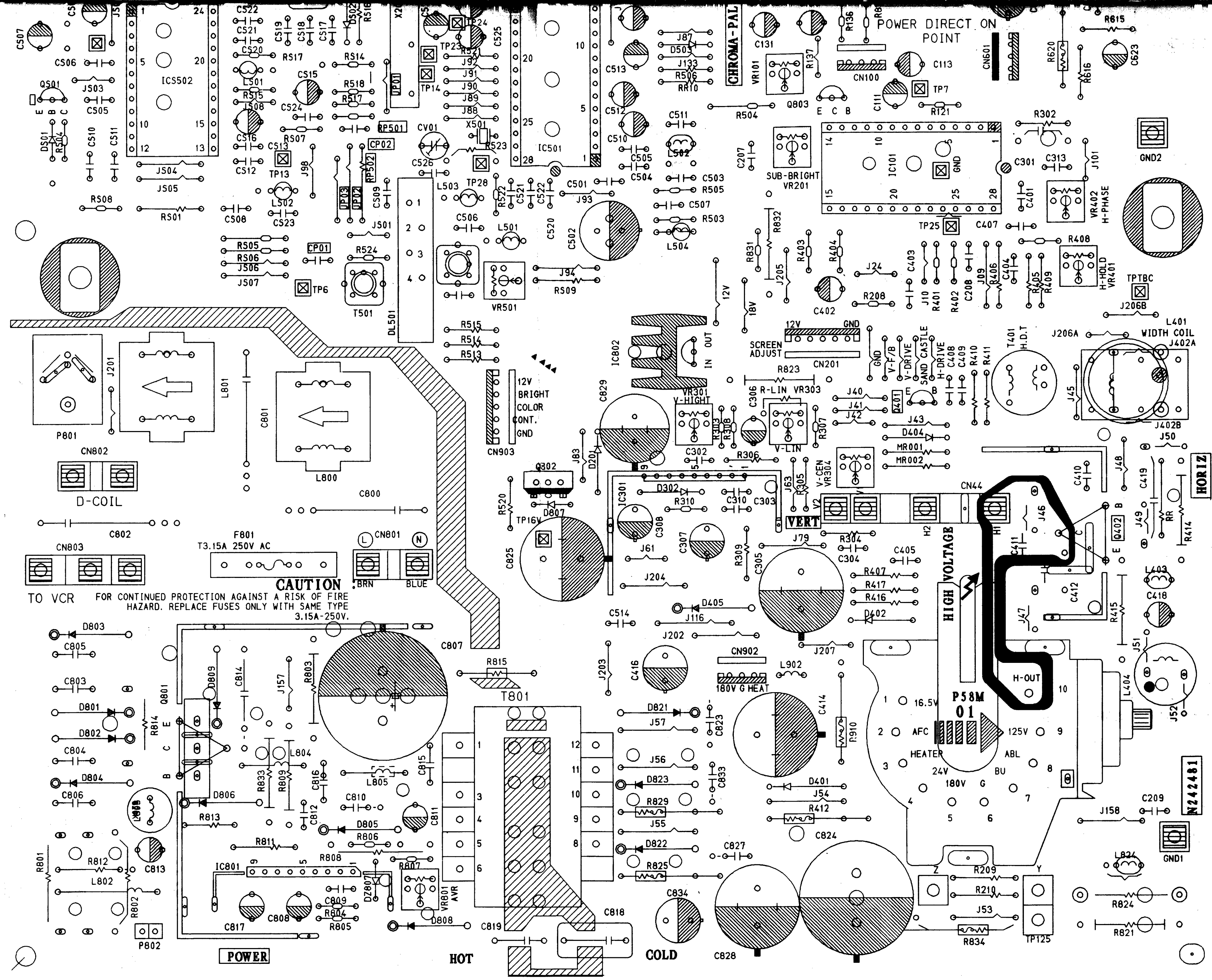
PWB-MAIN


P58M 33004-242-481
CHROMA-SECAM
CHROMA-PAL
SOUND
VERT
HORIZ
HIGH VOLTAGE
TPB
TP GND
TPA
TP VIDEO
VIDEO INPUT
SAND CASTLE
GND3
GND4
GND2
X202
CN901
GND
RED
GRN
B
12V
RP506
RP505
J80
J81
TP51
R550
R551
R552
CN902
180V GND H
12V B GRN R GND
CN903
12V
BRIGHT
COLOR
CONT.
GND
P801
J201
L801
C801
L800
D-COIL
CN802
C802
CN803
TO VCR
F801
T3.15A 250V AC
CN801
BRN
BLUE
CAUTION
FOR CONTINUED PROTECTION AGAINST A RISK OF FIRE HAZARD. REPLACE FUSES ONLY WITH SAME TYPE 3.15A-250V.
C800
D803
C805
C807
R815
IC802
IN OUT
SCREEN ADJUST
CN201
R823
VR301 V-HIGHT
R-LIN VR303
V-LIN
V-CEN VR304
IC301
D302
R310
C310
C303
C306
C307
R309
R305
R307
J61
J79
J204
J202
J116
D405
D402
C514
CN44
J207
L902
C825
C829
R520
TP16V
D807
Q802
J83
D201
R306
J63
V2
H2
H1
J46
J47
J48
J49
J50
J51
C410
C411
C412
C419
C418
L403
R414
R415
R416
R417
R407
C405
C304
R304
J209
D101
CN804
Q110
Q111
C130
C131
R136
R137
R130
R131
R132
R133
R134
R135
C132
R502
R501
R504
Q803
CN100
CN601
C113
TP7
C111
R121
R830
POWER DIRECT ON POINT
C620
C615
R615
R620
R616
C623
VR101
J87
D501
J133
R506
RR10
C511
L502
C503
R505
C507
R503
L504
C501
J93
C502
C520
C506
L501
J94
R509
VR501
R524
T501
DL501
CP01
TP6
R505
R506
J506
J507
C508
L502
C523
TP13
J98
R508
R501
J504
J505
C501
J502
C507
CS06
Q501
J503
C505
DS01
R504
C510
C511
CS04
CS03
RS03
R512
J73
T501
R513
C514
R502
CS02
R511
J75
C201
J76
J77
TP12V
VR501
C522
C521
C520
C519
C518
C517
D502
R516
RS17
RS14
R518
R517
C515
C524
R507
RP501
CP02
RP502
TP13
J98
C516
C512
C509
VP03
VP02
J501
CV01
C526
X501
C523
TP28
L503
R522
C521
C522
J86
J78
J159
J155
C515
R509
TS02
X201
J120
C516
C513
C512
C510
C505
C504
IC501
J92
J91
J90
J89
J88
TP23
TP14
R514
R510
R511
R512
R513
J82
D506
D507
D508
C517
C518
C519
RP506
RP505
J80
J81
TP51
R550
R551
R552
C524
C525
C523
TP24
R519
IC602
C616
C621
C617
L601
Q612
R614
C613
R619
C618
R617
C614
R618
R621
IC101
SUB-BRIGHT VR201
C207
R302
C301
C313
J101
VR402 H-PHASE
C401
TP25
C407
R408
H-HOLD VR401
R832
R831
R403
R404
J205
J24
C403
J10
R401
R402
C208
J09
R406
C404
R405
R409
C402
R208
12V
GND
18V
TPTBC
J206B
J206A
L401 WIDTH COIL
J402A
J402B
T401 H.D.T
J45
C408
C409
R410
R411
H-DRIVE
SAND CASTLE
V-F/B
GND
J40
J41
J42
J43
D404
MR001
MR002
R401
J44
J63
J79
J61
J204
J202
J116
D405
D402
C514
J207
L902
CN902
C825
C829
R520
TP16V
D807
Q802
J83
D201
R306
IC802
IN OUT
SCREEN ADJUST
CN201
R823
VR301 V-HIGHT
R-LIN VR303
V-LIN
V-CEN VR304
IC301
D302
R310
C310
C303
C306
C307
R309
R305
R307
CN44

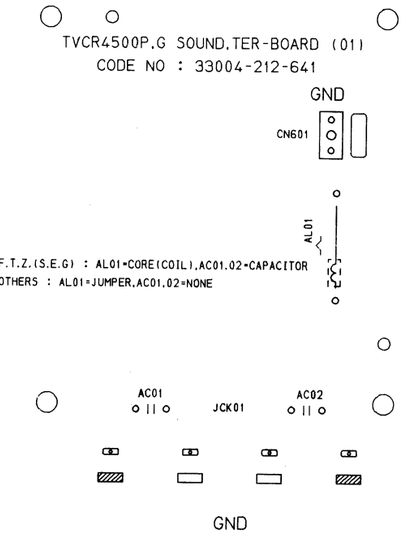

MASTER SWITCH
SW801

PWB-CRT

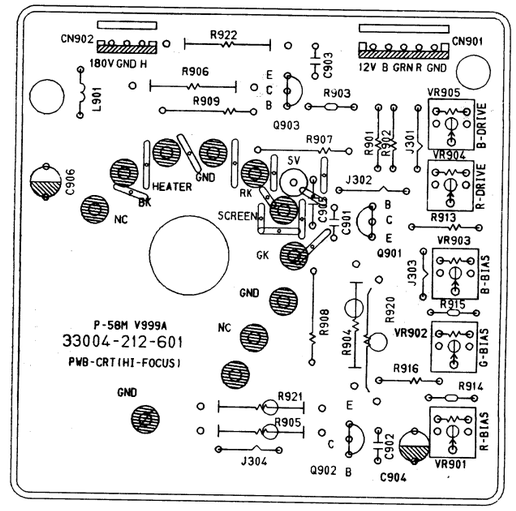

CN902
180V GND H
CN901
12V B GRN R GND
HEATER
GND
RK
SCREEN
GK
NC
BK
5V
B-DRIVE
R-DRIVE
B-BIAS
G-BIAS
R-BIAS
P-58M V999A
33004-212-601
PWB-CRT(HI-FOCUS)

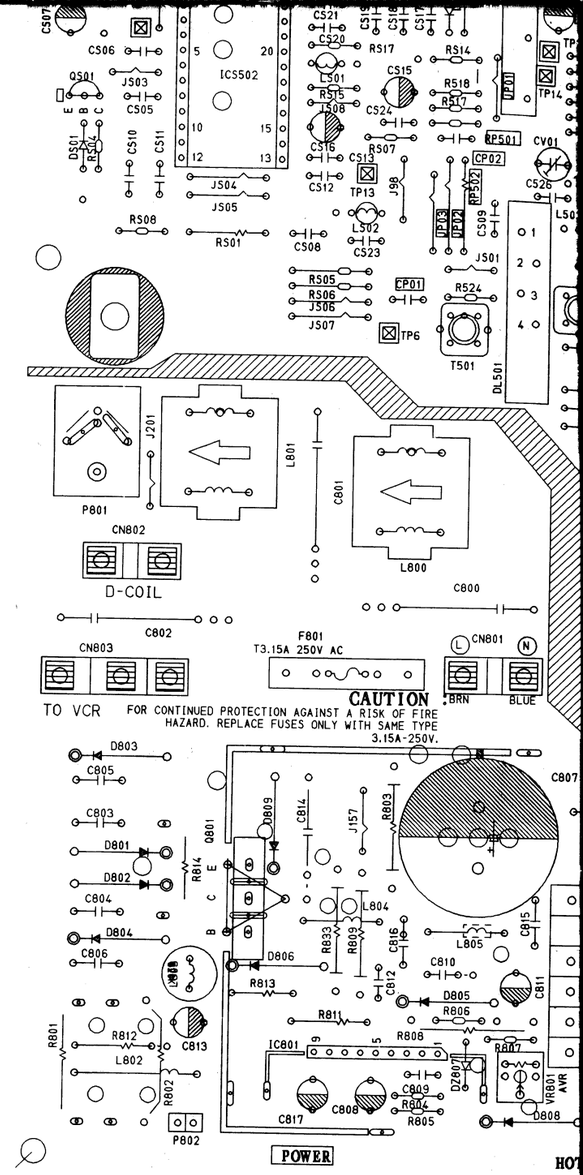

CHROMA-PAL
POWER DIRECT ON
POINT
SUB-BRIGHT
VR201
H-PHASE
H-HOLD
GND2
12V
BRIGHT
COLOR
CONT.
GND
SCREEN
ADJUST
V-HIGHT
R-LIN
V-LIN
V-CEN
SAND CASTLE
H-DRIVE
V-DRIVE
V-F/B
H.D.T
WIDTH COIL
HORIZ
VERT
D-COIL
TO VCR
F801
T3.15A 250V AC
CAUTION
FOR CONTINUED PROTECTION AGAINST A RISK OF FIRE
HAZARD. REPLACE FUSES ONLY WITH SAME TYPE
3.15A-250V.
BRN
BLUE
180V G HEAT
HIGH VOLTAGE
P58M
01
16.5V
AFC
HEATER
24V
180V
G
BU
ABL
125V
H-OUT
POWER
HOT
COLD
GND1
N242481

PWB-SOUND, TERMINAL



PWB-CRT





SCHEMATIC DIAGRAM

CHASSIS. P58M
PAL/SECAM-B/G REMOTE CONTROL SYSTEM

IC101
H-OSC, V-RAMP,
COIN.
SAND-GEN
ICS502
SECAM

ICS502
SECAM PROCESSOR

IC501
PAL DECODER

IC801
TDA4601

IC301

CN44
HOR. VERTICAL DRIVE

CN904
FROM VCR

DC

COMPOSITE
DIDEO
SIGNAL

CHROMA TP7 TD6 LUMINANCE

TARANS-FLYB

FOCUS

SCRE

ABL

CN44
HOR. VERTICAL DRIVE

IC301
PULSE SHAPER
OUT PUT
FLYBACK GEN
DRIVE
NC
GND

TARANS-FLYBACK
FOCUS
SCREEN
ABL

PWB-CRT
HEATER
GND
CN902
CN901
12V
V999 COLOR PICTURE TUBE
54HGB99X

ICS502
SECAM PROCESSOR

IC501
PAL DECODER

PWB-CONTROL
COLOR
CONTRAST
BRIGHTNESS
TO CONTROL
BRIGHT
COLOR
CONTRAST
GND

IC502
SECAM PROCESSOR

IC501
PAL DECODER

IC602

ACTIVE LOW

AUDIO AMP

SECAM DELAY

PAL DELAY

TO CONTROL

BRIGHT

COLOR

CONTRAST

GND

TO MAIN CHASSIS GND

TO SPEAKERS

HOT

COLD

PWB-CONTROL

COLOR

CONTRAST

BRIGHTNESS

ASSY-SOUND. TER-BOAD

EXPRESSION

1 Resistance is shown ohm K=1.000 M=1.000.000

2 Unless otherwise noted in schematic all capacitor values less than 1 are expressed in mfd. the values more than 1 in pF.

3 Unless otherwise noted in schematic all inductor values areexpressed in uH.and the values less than 1 in mH.

4 * mark shows the difference by models

NOTE

The circuits are suject to change without notice to improve the picture quality.

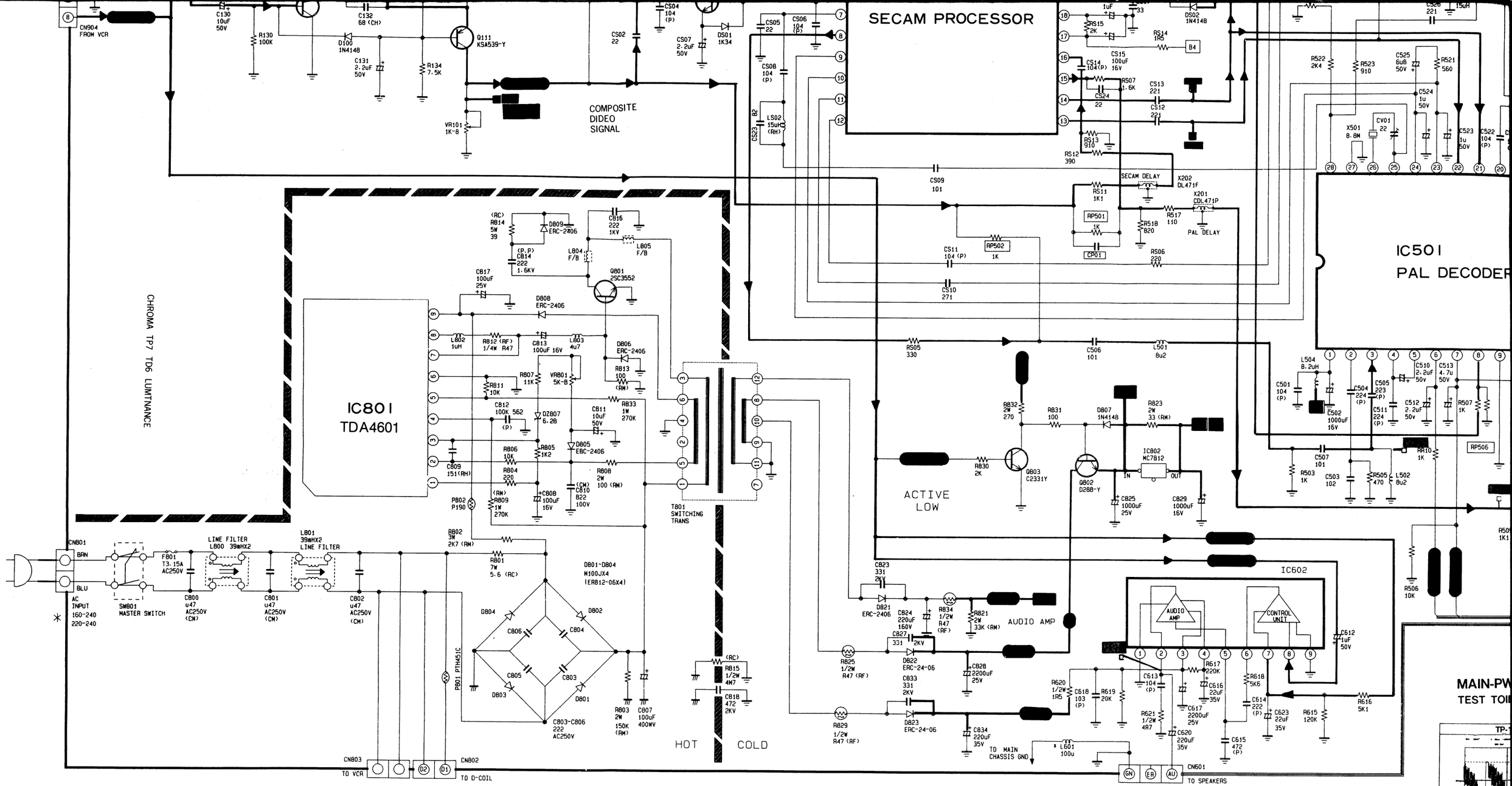
MAIN-PWB

TEST TOINT WAVE FORM

TP-1 TP-2 TP-3 TP-10 TP-11 TP-12

TP-4 TP-05 TP-6 TP-13 TP-14 TP-15

TP-7 TP-8 TP-9 TP-16



CAPACITOR	
TYPE	MARK
Ceramic	No Mark
Polyester	(P)
Tantalium	(T)
Metal Polyestor	(CM)
Polypropylene	(PP)
Polyester Polypro	(DSA)
Chemical Electrolitic	
Chemical NOn-Polar	

RESISTOR	
TYPE	MARK
Carbon Composition	(RC)
Oxide Metal Film	(RS)
Metal Film	(RM)
Cement	(RW)
Variable REsistor	
Positive Resistor	

EXPRESSION

1 Resistance is shown ohm K=1.000 M=1.000.000
2 Unless otherwise noted in schematic all capacitor values less than 1 are expressed in mfd. the values more than 1 in pF.
3 Unless otherwise noted in schematic all inductor values areexpressed in uH.and the values less than 1 in mH.
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